The Magazine from Trelleborg Sealing Solutions

in the groove

The world of seals and service

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FOOD & BEVERAGE

In Good Taste

Preventing flavor carryover

AEROSPACE

Sealed for Life

The future of aerospace sealing

FLUID POWER

Pumping Away

Keeping pumps operating effectively

CONTENTS

NEWS

SERVICES

Automated Inventory

Trelleborg Sealing Solutions launched the IntelliStok® automated inventory management system in the United States and Canada in February 2021.

This latest ServicePLUS innovation simplifies C-part inventory management by eliminating the need to manually check and scan Kanban-based inventory items. IntelliStok® senses when inventory bins are empty and automatically sends replenishment orders to Trelleborg, making restocking easier than ever. Real-time inventory tracking enables customers to right-size their inventory levels and reduce their investment in C-part stock.

In today's environment, this touch-free inventory management system also improves employee safety and delivers further efficiency by eliminating the hand-held scanner required by similar systems. No scanner means no opportunity to spread germs and no sanitizing needed between uses. And unlike other advanced delivery options, wireless IntelliStok® seamlessly integrates into Kanban systems without requiring modification to existing equipment.

Scan the QR-Code to learn more about IntelliStok®.

E-COMMERCE

Buy Online

Trelleborg will launch Seals-Shops for fluid power, and food, beverage and water in Q2 2021, for selected North American customers.

Up first is the Fluid Power Seals-Shop, which will simplify the procurement process by providing 24/7 access to online ordering of seals and wear rings critical to the function of hydraulic components in fluid power applications.

The new e-commerce site will enable selected North American Fluid Power customers to access online invoice payment, complete order history, order shipment tracking, product search functionality and more.

The launch of the food, beverage and water Seals-Shop in the US will follow shortly. Also coming later this year, Trelleborg plans to expand the Chemical Transportation Seals-Shop, which launched in 2020, to include additional products, enabling more customers to purchase from the site.

FACILITIES

Delano Expands

In September of 2020, Trelleborg Healthcare & Medical completed an expansion of its Delano, Minnesota-based manufacturing facility in the US.

The expansion includes the addition of a 6,000 square foot ISO Class 7 cleanroom and enhanced silicone molding and contract manufacturing capabilities to accommodate the increasing demand for product development. The added capabilities also enable the facility to reduce lead times.

The services performed at the Delano facility extend beyond technical silicone and thermoplastic molding to include assembly and secondary operations, in-house tool making, high-precision machining for micro molding and automation. The Delano facility is ISO 9001:2016 and ISO 13485 certified and is also FDA registered.

ANNIVERSARY

Happy Birthday, Trelleborg!

One hundred and fifteen years ago, on October 30, 1905, 'Trelleborgs Gummifabriks Aktiebolag' was registered at the Royal Patent and Registration Office in Sweden. Trelleborg was established in the small city of of the same name in the south of Sweden, rapidly becoming Scandinavia's leading rubber production company, with bicycle and car tires, industrial rubber goods and raincoats as its principal products. Today Trelleborg is a world leader in engineered polymer solutions with employees in more than 50 countries.

CERTIFICATION

AS9100 Rev D Certification Renewed

The Trelleborg Sealing Solutions facility in Bangalore, India, has been awarded Aerospace Quality Management System AS9100 Rev D certification after a renewal audit conducted by LRQA in November 2020.

The manufacturing site has been certified for this standard since 2011.


Certificate of Approval

TRELLEBORG INDIA PRIVATE LIMITED

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Digital Update

Check out our latest digital resources

Watch the film

Watch the Sealing Solutions for Fluid Power Components Film

Hydraulic systems are fundamental to the operation of everything from earthmoving equipment to machine tools. The principles are the same, regardless of the application, and the seals are essential to ensure reliable, long-life performance.

This new film gives an overview of the latest sealing technologies for rods and pistons for a selection of applications:

- Pumps and motors
- Accumulators
- Rotary manifolds
- Vehicle drivetrains
- Engines

The seals are shown in operation through 3D visualizations to better demonstrate how each seal contributes to the overall performance of the sealing system.

Scan to find all of our films and animations.

Listen to the podcast

Catch up with the Virtual Conference!

For those who missed the livestream of the recent Virtual Conference, recordings are available to watch at any time. Join our host, Sarah Yvonne Elsser, for panels on three hot topics on the future of technology: electrification, digitalization and sustainability.

Simply log in using your existing username and password to view the conference again. You can also forward the link below to friends and colleagues to sign up and view the recordings.

Find out more about the Virtual Conference Europe on page 10.

To catch up with the conferences, go to: www.tss-virtualconference.com/recap/
Currently only available in English.

LISTEN TO THE INSIGHTS AND BEYOND PODCAST!

Trelleborg Sealing Solutions has released four deep-dive podcast episodes that look into the issues that affect society today and how polymers can be used to solve them.

Go to the microsite, or find the podcast on your favorite platform: Google Podcasts, Spotify, Apple Podcasts, Deezer or Amazon Music.

Read more about the podcast on page 26.

Listen to the podcast now!
www.tss-podcasts.com

Hot Off the Press

Find out about the latest literature from Trelleborg Sealing Solutions.

New Fluid Power Brochures for Specific Industries

Two new brochures have been released that highlight products, services and solutions to address the requirements of hydraulic components in machine tools and agricultural equipment.

Sealing Solutions for Machine Tools & Manufacturing Equipment

Injection molding machines require robust and long-lasting seals to ensure smooth and uninterrupted production. Trelleborg Sealing Solutions highlights some of its latest products to meet these requirements, incorporating high-specification materials and Lubrication Management technology to increase service life of the entire system.

Read the brochure to learn how Trelleborg can assist with solving engineering challenges at any stage of development. See where our solutions can impact performance within each area of an injection molding machine, and discover some of the science behind how they work.

Sealing Solutions for Agricultural Equipment

Operating in harsh and dirty environments all day long, tractors are the most used machine for farming and agriculture worldwide. Whether a low horsepower work vehicle or a giant machine harvesting acres of grain, the seals used are critical to effective, long-life performance.

Trelleborg Sealing Solutions has applied its Lubrication Management and other technical innovations to further optimize whole system performance. Inside the brochure, find out how Turcon® Roto L extends the lifetime of Central Tire Inflation Systems by sealing only when required, and discover the many different application areas that Trelleborg contributes its expertise to within a single tractor!

MORE INFORMATION

To view all Trelleborg Sealing Solutions catalogs, brochures and flyers, go to:

trelleborg.com/seals/literature

New Series of Isolast® PureFab™ Flyers

The Isolast® brand has represented the highest degree of material performance and formulation since the 1960s, giving unparalleled strength and resistance to one of the broadest ranges of chemicals available. Isolast® PureFab™ is a dedicated line of FFKM materials, specifically formulated to meet the purity requirements and unique demands of the semiconductor market.

These leading-edge materials ensure process yield is maximized and maintenance cycles are extended through ultra-low outgassing in high vacuum conditions and reduced particle generation. Four new compounds extend the portfolio to meet specific application requirements:

- **Isolast® PureFab™ JPF10** - High-purity, fully organic material for high temperature applications
- **Isolast® PureFab™ JPF20** – A new level of plasma resistance for the most aggressive uses
- **Isolast® PureFab™ JPF21** – High temperature performance in oxygen and fluorine plasma
- **Isolast® PureFab™ JPF30** – A translucent, extreme purity FFKM with excellent particle performance

Conductive Shielding Solutions

As aircraft incorporate more advanced sensors, electronics and wireless technologies, it is vital that aircraft engineers and designers address electromagnetic interference (EMI).

This interference can originate from extreme weather events, such as lightning strikes or solar flares, or the aircraft's own electrical systems.

Most polymers and composites are not conductive, but through specialized formulation, materials can allow currents to pass through. Read about Turcon® MC1 and Turcon® MC2, two new compounds developed for this purpose, and see where and how they can make flying a safer and more comfortable experience - without compromising on performance.

Automotive Sealing Solutions Brochure

eMobility is booming globally, with component manufacturers searching for effective solutions to meet their emerging challenges.

From the drivetrain to the battery and electronics, Trelleborg Sealing Solutions has developed solutions in tandem with the automotive industry to stay ahead of emerging issues and desires.

This brochure takes a deep-dive into the products and services on offer, detailing the benefits that can be gained by working with Trelleborg. Exploded-view diagrams will show you where products, such as HiSpin® rotary seals, improve powertrain performance and how integrated custom molded battery seals fit within the battery.

Challenges and Opportunities for Future Technology Trends

Virtual is becoming the new normal. In a challenging year, Trelleborg Sealing Solutions took to digital to keep customers abreast of the latest industry trends.

By Lara Haas

Watch the Virtual Conference Europe
Recordings of the event are available at:
www.tss-virtualconference.com/recap/

"IN 2020, HOW WE COMMUNICATE HAS BEEN INCREASINGLY DRIVEN BY DIGITAL PLATFORMS,"

says Robert Zahiri, Director Global MarCom & Digital Services at Trelleborg Sealing Solutions. "This has pushed us to become more innovative in how we share our expertise. We've already produced numerous webinars and tech talks, all of which are available free-of-charge on our website. The natural next step was to raise the bar and create interactive virtual conferences and podcasts."

Virtual Conference Europe

AFTER ACHIEVING A MILESTONE WITH A GERMAN LANGUAGE VIRTUAL CONFERENCE in July, Trelleborg Sealing Solutions hosted its second successful **Virtual Conference Europe** on 25th November 2020. Free to attend, the conference enabled more than 700 customers and interested experts from all over the world to explore key trends affecting business now and in the future: **#electrification, #digitalization, #sustainability.**

“This is the first Virtual Conference we have held for all customers across Europe, and we are very excited with the outcome of the event,” says Jürgen Bosch, Business Unit President Global Aerospace & Marketing Europe at Trelleborg Sealing Solutions. “Though there was some focus on polymer technology, this was mainly a platform to take a deeper look at key trends that are determining product and material development.

“Electrification, digitalization and sustainability are influencing business decisions now, and will do so even more in the future. We were proud to attract a group of renowned keynote speakers and panelists to be part of the event. Time is precious, but we received a lot of positive feedback that attendees found the Virtual Conference of the highest added value and that it contributed to their greater understanding of major industry trends.” →

TK Elevator Test Tower
The virtual conference was held at the TK Elevator Test Tower in Rottweil. A tourist attraction, it boasts Germany's highest visitor platform at 232 metres, and is used to test and certify new elevator technology, leading to significantly shorter development times for future skyscrapers.

Find out more about each of the sessions at the Trelleborg Sealing Solutions Virtual Conference Europe 2020

#digitalization

Artificial Intelligence – How to Be Part of a Smarter Ecosystem

Katrin-Cécile Ziegler, who supports small- and medium-sized companies in successfully setting up digital infrastructures, highlighted how Artificial Intelligence (AI) is used today. She showed where Europe stands internationally in the adoption of AI, and how it opens opportunities for every company to gain a competitive advantage.

She was joined by panel members Dr. -Ing. Sven J Koerner, Founder thingsTHINKING GmbH and researcher, Dr. Angelika Schmid, Senior Data Scientist from IBM, and Dr. Johannes Kunze von Bischhoffshausen, Manager Digital Transformation at Trelleborg Sealing Solutions.

From left: Panelists Dr. Johannes Kunze von Bischhoffshausen, Dr. Angelika Schmid and Dr. -Ing. Sven J Koerner with keynote speaker Katrin-Cécile Ziegler, and Tech-Moderator Sarah Yvonne Elsser.

#sustainability

Engineering Toward a More Sustainable Future

Prof. Dr. Will Ritzau, Professor for Digital Business Management & Sustainability at University Fresenius, Germany, and Former Director Sustainability, SAP SE, explored why dwindling resources require supranational defined goals that apply to everyone. He commented on why the monetary recording of social and ecological performance is necessary in order to identify and manage sustainable corporate developments.

He was joined by panel members Dr. Eva Beierle, Development Engineer Aseptic and Process Technology from Krones AG; Marina Ponti, Global Director United Nations Sustainable Development Goals Action Campaign; and Prof. Dr. Konrad Saur, Vice President Innovation & Technology at Trelleborg Sealing Solutions.

From left: Panelists Prof. Dr. Konrad Saur, Dr. Eva Beierle and Prof. Dr. Will Ritzau with Tech-Moderator Sarah Yvonne Elsser.

> "We are at a turning point for people and our planet. We believe very strongly that we have a once-in-a-generation opportunity to turn things around and make happen the bold shift that is required to address the failure in our system and build safer, more equitable and sustainable societies,"
>
> **MARINA PONTI,** *Global Director United Nations Sustainable Development Goals Action Campaign.*

#electrification

The Future of Mobility in an Electrified World

Don Dahlmann, journalist and car enthusiast, demonstrated how electrification of mobility is on its way to the mass market, where alternative mobility concepts stand today and the impact of smart technologies is making mobility more sustainable. He explained how application-specific alternative drive systems, even beyond battery-powered ones, make sense.

Afterwards, he discussed the future of mobility with renowned experts Jochen Rudat, founder of Electric Ventures & muchbetterelectric, who previously spent 10 years at Tesla; Dr. Martin Busche, Farasis Energy Europe; and Axel Weimann, Director Global Segment Automotive & Trucks at Trelleborg Sealing Solutions.

From left: Panelists Axel Weimann, Jochen Rudat and Dr. Martin Busche with keynote speaker Don Dahlmann and Tech-Moderator Sarah Yvonne Elsser.

Following the panel discussion, experts from Trelleborg Sealing Solutions presented application examples to create a link to sealing technologies

In the **#digitalization** deep-dive session, Domenico Tucci, IoT Client Solution Architect, showed how Trelleborg collaborates with its customers. From sensor selection through to Data Analytics and Artificial Intelligence.

Within the **#sustainability** deep-dive session, Martin Krüger, Area Sales Manager Industrial, presented a sustainable joint R&D development project with Krones.
→ You can learn more about it on pages 27.

During the **#electrification** deep-dive session, Sergio Amorim, Head of Customer Management & Engineering, presented eMobility sealing solutions, which accelerate the performance of eDrives.

Sealed for Life

Introducing the next generation seal for hydraulic systems in aircraft – Turcon® VL Seal® II.

By Jan Sklucki

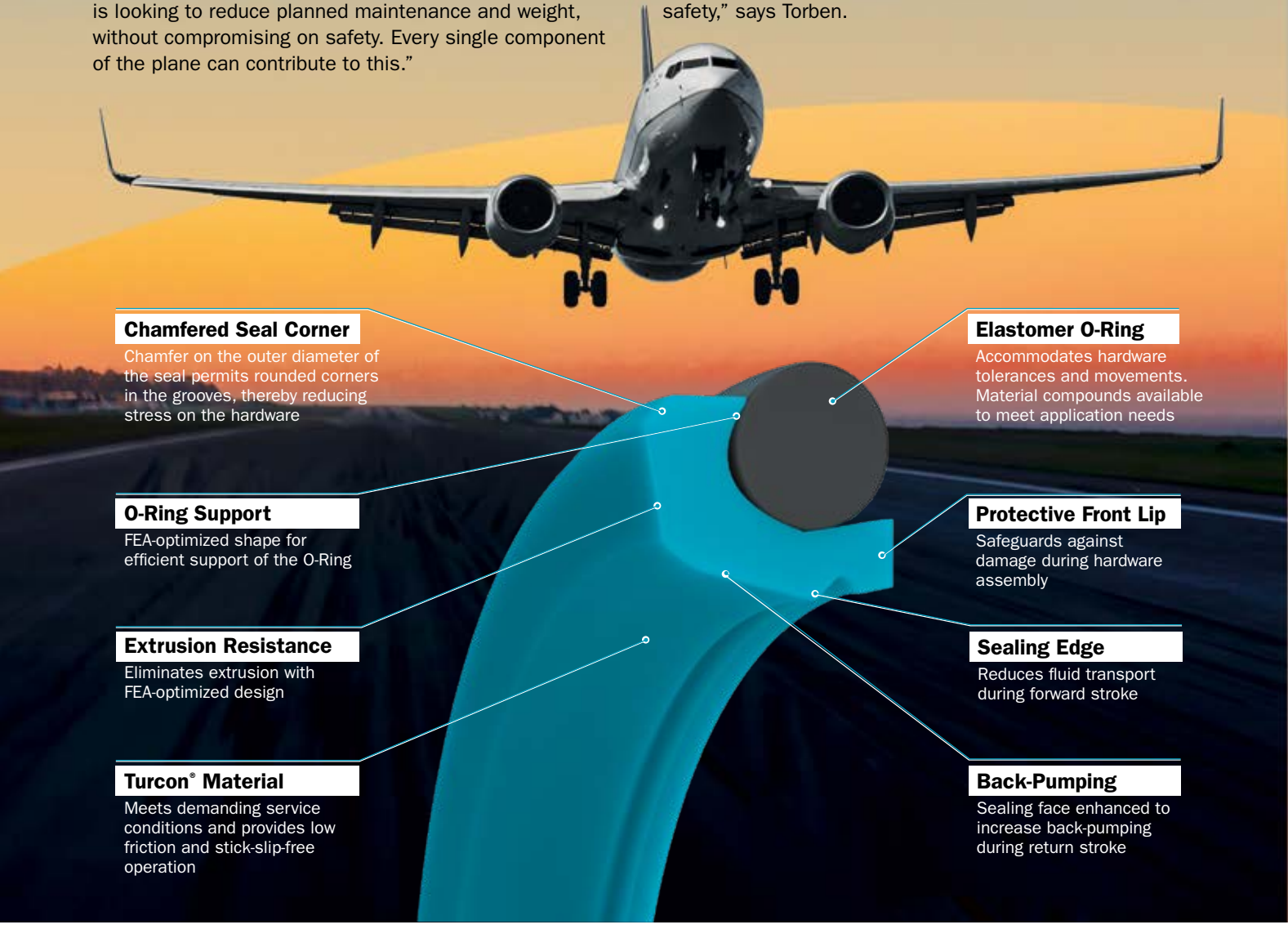
IN A NORMAL YEAR, NEARLY 200,000 FLIGHTS JET ACROSS THE SKIES, transporting passengers for business and pleasure quickly and efficiently. Though many people marvel at them gliding through the air, far fewer take the time to consider all the engineering time and thought put into each individual component.

"Weight and time are money," laughs Torben Andersen, Director Aerospace Segment Management at Trelleborg Sealing Solutions."It makes sense that the industry is looking to reduce planned maintenance and weight, without compromising on safety. Every single component of the plane can contribute to this."

Evolved design

Building on an already successful design, Turcon® VL Seal® II is an evolution of the original Turcon® VL Seal® . Its predecessor has been successfully used as a unidirectional rod seal for reciprocating motions for years, installed in aircraft traveling all over the world.

"Turcon® VL Seal® is an excellent seal – it's back-pumping abilities are unique - but we saw an opportunity to make our seals contribute more to the aerospace industry's overarching goals: weight reduction, reduced maintenance and increased safety," says Torben.



Trelleborg Sealing Solutions applied its usual attention to detail and focused its resources on the seal, to see what could be achieved. “Our engineers are capable of combining many functions in the same part. What looks simple is actually the result of many hours of testing, calculating and re-designing to ensure that every gram of material is both necessary and contributing to overall functionality,” says Torben.

Engineered for success

The seal itself is a carefully engineered L-shaped Turcon® part with a supporting O-Ring to increase stability and resilience. Its cross-sectional profile is unique, with each angle designed to offer benefits to overall performance. Chamfered corners allow rounded installation grooves, reducing hardware stress. The seal back is angled in such a way to allow the width to react to the pressure encountered at the time. This feature combines with the geometry of the sealing lip to replenish fluid during strokes to increase seal life.

The lip itself also shields the seal during installation, preventing damage, but ‘lifts’ away from the rod during operation to ensure it doesn’t compromise friction capabilities. As every aspect is critical to overall performance, the seal contact face was extended and curved to protect the supporting O-Ring and keep it in position, even under high pressures.

Testing and development

Much of the difficult design work was achieved through FEA simulations, ensuring extrusion is kept to a minimum and that engineers could fully understand the pressure distribution across the whole seal profile. This led the design in the correct direction, but the results needed to be confirmed. The fledgling Turcon® VL Seal® II was tested on the Trelleborg Sealing Solutions primary flight control seal test rig, which simulates combinations of extreme operating conditions.

Pressures reach 5,000 psi / 345 bar at temperatures from -62 °C to +163 °C / -80 °F to +325 °F repeatedly to replicate real world conditions as closely as possible. The test bench crucially can achieve pressure rise rates of 360,000 psi/second (24,800 bar/second), meaning that millions of pressure cycles can be run, shortening development time from months to weeks. The results were clear. Back-pumping performance is more than double that of the original Turcon® VL Seal® with half the accumulative leakage over one million cycles.

Holistic approach

Attention has been paid to the total arrangement, as the seal does not exist in isolation. “Back-up Rings are very important to provide extra stability and prevent extrusion, but can contribute to wear and friction,” says Torben.The Back-up Ring for Turcon® VL Seal® II was re-evaluated and specially engineered with Trelleborg’s Lubrication Management principles in mind. It permits a small amount of fluid through to lubricate the entire system, decreasing friction and extending life of both the hardware and the seal. These are provided as standard with Turcon® VL Seal® II. To fully optimize the performance and reliability, two Turcon® VL Seal® II can be installed together with scraper elements to remove the need for drain lines completely as the pressure can be more accurately controlled between the seals with an enhanced back-pumping ability.

Torben adds: “This view and understanding of the whole arrangement can only be achieved through years of expertise. Our Lubrication Management technologies, seal engineering and material choices can increase life of not only the seal, but the whole system.”

Sealed for life

The lifetime of each product is always studied, as it is vital to timing and planning maintenance. Using the features of the seal, these components aim to be ‘sealed for life’. “What this means is that we expect the seals to last the entire lifetime of the actuator – no replacement,” explains Torben.

Turcon® VL Seal® II represents a true evolution of its predecessor and is rapidly becoming the standard seal for these kinds of application. “It’s now easier to install, more reliable and performs better, reducing weight further and increasing fuel efficiency” finishes Torben. As one of the most versatile aerospace seals ever developed, it fits into standard AS4716 grooves, enabling easy replacement of existing seals with the Turcon® VL Seal® II in primary and secondary flight controls in airplanes and helicopters and landing gear shock absorbers and actuation systems. It is available in a range of Turcon® and Zurcon® materials for use in a wide variety of extreme operating conditions. These are combined with O-Ring compounds suitable for use with all hydraulic fluids and service parameters.

MORE INFORMATION

Scan the QR-Code to learn more about Turcon® VL Seal® II.

Digital Convergence

Digitalization has become a buzzword over recent years, being heavily used in political debates and also in public discussions. The main reason is that computers have become ubiquitous in our life, in both our private and professional worlds. This pervasiveness is hiding the technical driving forces behind the digitalization process.

By **MICHAEL RESCH**, *High Performance Computing Center (HLRS), University of Stuttgart, Stuttgart, Germany*

The Old World

For quite some time, computer speed was the most important visible parameter of IT-development, and for decades, High-performance Computing (HPC) stood at the forefront of this. Computer speed benefitted from what used to be called Moore's law – a statement that Gordon Moore published more than 50 years ago, observing that the speed of a processor would increase about every 12 months – later modified to 18 months.

Moore's law is coming to an end within the next decade, and we are not going to see this kind of increase in speed in the future anymore. But computers today have already reached a level of performance, even in handheld devices, that makes them a powerful and ever-present tool in the hands of everyone.

BIOGRAPHY

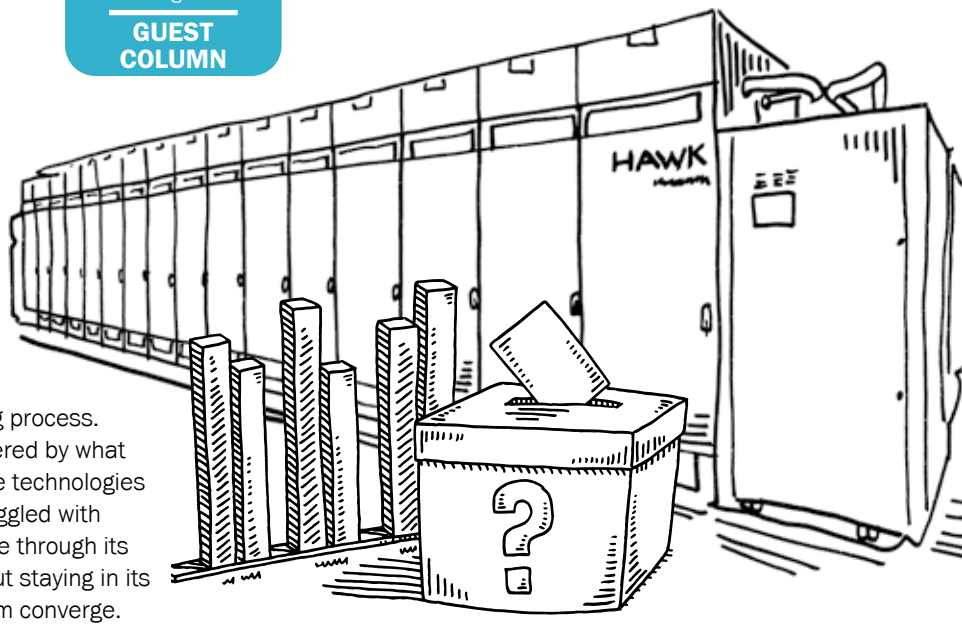
Prof. Michael Resch

Prof. Michael Resch is the director of the High Performance Computing Center Stuttgart (HLRS) since 2002 and professor for high performance computing at the University of Stuttgart. He has spent 32 years in IT research and industry in Austria, Germany and the US. The focus of his work and research is on computer simulation, artificial intelligence and digitalization in general.

New Trends in IT

As we see an end in performance acceleration, we also see two emerging trends. One of them is the Internet of Things (IoT). By integrating microprocessors into practically everything and being able to connect them all together, we create a world of computers that keep collecting and processing data at a rate unprecedented in history. These sensors/processors are everywhere and long-lasting. They create a world of data and information by themselves. A world which is difficult to follow and even more difficult to understand given the amount of data created.

However, there is a second technology which helps to make sense of all the data and turn them into meaningful information and potentially even reasonable decisions. The new wave of artificial intelligence (AI) technologies has created a novel toolbox that allows computers to analyze and learn from data collected and prepare decisions based on it. These methods ignore Alan Turing's original ideas of AI as a way to copy human behavior. Quite the contrary: today, AI is aiming at being much better than human beings in its learning and decision-making processes. While early approaches still focused on games like Chess, Go or Jeopardy, the new AI 'kids-in-town' are aiming at finding patterns, extracting hidden dependencies and coming up with new rules found in the depth of data that a human being could never browse, much less digest intellectually.



Digital Convergence

However, AI would also be lost in data if it were not for the computing performance that HPC has made available over the last few decades. And, both AI and HPC would be lost if it had not been for the IoT revolution that found new ways to provide us with all the data needed for the decision-making process. So, what we are facing is a revolution in IT triggered by what should be called 'digital convergence', with three technologies coming together that had previously mostly struggled with their own challenges. Each of the three has gone through its own development cycles, improving over time but staying in its narrow field of expertise. Today the three of them converge.

A New World of Applications

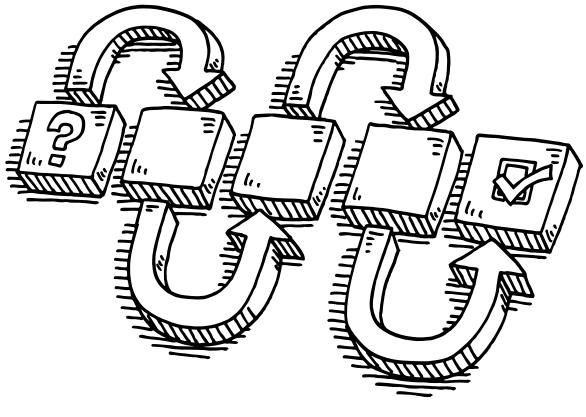
New opportunities open up as we start to understand that we have to bring together the bits and pieces to create something truly new and revolutionary. The problems to which digital convergence can be applied are manifold.

Simulation

Computer simulations allow for the optimization of processes and products. They do so by creating a digital twin of a product and then running virtual tests on it. So far, this is a human-controlled process requiring human decisions about the correct parameters. The more parameter variations that are simulated, the more information the set of simulations can provide. Simulations, in turn, can be compared to data gained from real world experiments. However, simulation data sets are large and with many parameter variations, users start to get lost. Digital convergence can help make this situation much easier. Experimental data can be collected automatically and be easily integrated into simulation scenarios. AI can help to analyze simulated results, learn from them, and suggest optimum parameters to the end user.

Industry 4.0 / Factory of the Future

In the factory of the future, digital convergence plays an important role. All equipment, parts, tools, materials, processes, and people act as sources for data. This data has to be collated and analyzed, and then decisions have to be made as to how to proceed with production to meet customer requirements, as well as any other criteria within which the factory of the future has to operate. AI provides the necessary methodology to not only provide an analysis of the data, but also to learn from previous data and continuously improve the decision in the process. HPC provides the necessary computing power for both AI and simulations of the factory of the future, based on decisions made by AI-systems.



Political Decision Making

The political decision-making process heavily relies on correctness of data, ability to estimate the impact of decisions and the ability to match intended and actual outcomes. Based on IoT technologies, data relevant for the political decision-making process can be accumulated, analyzed by AI and used as an input for HPC-based simulations to shape the future of a society. Data from all kinds of sources can then indicate whether the decision actually leads to the intended results. The impact of digital convergence on the political decision-making process can be seen in the current COVID-19 pandemic. Countries like Japan, South Korea, Singapore, Taiwan and China already rely on these technologies and are seeing excellent results in their handling of the pandemic.

The Human Factor

Digital convergence is faced with criticism because of its impact on the economy and our political system. One argument is that digital convergence will remove up to 40% of all jobs, targeting mainly low skill work. This is a process we have seen since the industrial revolution eliminated about 97% of all jobs in agriculture – to the benefit of an economy that meets the other needs of a society. A second argument is that human beings are going to lose control once digital convergence allows the creation of self-sustaining systems, removing human intervention from decision making processes. Industrial societies are familiar with the hidden operation of technology, but digital convergence will actually add to the problem as it takes the intellectual part of the decision process from the hands – or brains – of human beings. It remains to be seen how we can react to this to turn digital convergence into a tool to improve not only our lives but also our world.

At Your Service

Trelleborg Sealing Solutions is known for its innovative products. More than just a component supplier, our product range is enhanced by an extensive service offering: ServicePLUS. We chat with Uwe Hähnel to find out more.

By Maria Rifaut

IN SHORT

1. ServicePLUS offers more than just product and delivery, providing added-value services
2. By sharing information and trust with Trelleborg, it can collaborate closely and improve customer processes
3. Line walks are offered to strategic customers to identify areas of improvement and simplify business to generate savings for the customer and Trelleborg
4. Improvements are aimed at many aspects of business and capabilities are expanding further

UWE HÄHNEL
Director ServicePLUS Lead Group in Europe & Strategic Projects for Trelleborg Sealing Solutions

+ AFTERMARKET

BOOST CUSTOMER CARE
ServicePLUS for the aftermarket ensures your customers get the support they need

+ ENGINEERING

OPTIMIZE PRODUCT & APPLICATION PERFORMANCE
ServicePLUS supports a full range of engineering activities

+ ENHANCED SUPPLY CHAIN

STRENGTHEN CORE BUSINESS PROCESSES
ServicePLUS ensures products are available when and how you need them

+ MANUFACTURING

MAXIMIZE PRODUCTION THROUGHPUT
ServicePLUS streamlines your manufacturing processes

Scan the QR-Code to learn how you can simplify your business with ServicePLUS:

With a portfolio of more than 20 services related to engineering, manufacturing, logistics and the aftermarket, Trelleborg Sealing Solutions is a long-term partner to our customers, providing market-leading expertise that supports every step of their value chain - and beyond.

Uwe Hähnel, Director ServicePLUS Lead Group in Europe & Strategic Projects for Trelleborg Sealing Solutions, talks to in the groove about what makes ServicePLUS such a valuable asset for customers looking to streamline their operations, and how they have reaped the benefits from the ServicePLUS portfolio so far.

ITG: You joined Trelleborg as Director Lead Group ServicePLUS in 2018. What was it about the ServicePLUS program that attracted you the most?

UH: One attraction was the strategy of Trelleborg Sealing Solutions to be a global sealing solution supplier that goes far beyond just product development and delivery by providing services.

In our private lives, we all recognize that not only products, but also services, are important. This is highly appreciated and is also key in our businesses. When we talk to our customers and partner with them, we identify many areas to apply our current services or even develop new ones.

It‘s always exciting to help our customers and gain a win-win situation by simplifying their operations, or to take on those essential tasks that are not a part of their production processes or their core business.

It’s about helping and supporting customers with a broad range of service capabilities and the opportunity to respond agilely in more ways to market requirements.

ITG: Since ServicePLUS was created, further services have been added to the portfolio or existing ones enhanced. What does this mean for you and your customers?

UH: For me, ServicePLUS is about partnering with customers and being the first choice for them in every step of their processes. This may mean utilizing an existing service, customizing one for a specific market need or even developing a new one.

It’s only when customers are willing to share their pain points, or highlight processes that they will consider outsourcing, that we can achieve ambitious targets together.

So, it’s always a pleasure when customers trust Trelleborg and share information on their products and processes to allow for close collaboration and recommend improvements. This can lead to the simplification of our customers’ businesses, generating savings for them and raising the quality bar. →

> "It is always exciting to help our customers and gain a win-win situation by simplifying their operations,"

UWE HÄHNEL
Director ServicePLUS Lead Group in Europe & Strategic Projects for Trelleborg Sealing Solutions

ITG: Offering services to support customers throughout every step of the value chain is a cornerstone of ServicePLUS. How does Trelleborg provide the dedicated expertise needed from beginning to end?

UH: We live in an agile world with a changing and complex environment. We need to understand processes with a 'helicopter view', while knowing the details as well. As applications are multifaceted and often have extreme specifications, it is essential that both customers and suppliers understand a market segment and the specific application as well.

ABOUT UWE HÄHNEL

Uwe Hähnel is married with three children.

He has a degree in mechanical engineering and process technology, and wrote his dissertation 30 years ago at Trelleborg's antivibration operation.

Since leaving university, he has always worked in the elastomer business in many different functions, departments, companies, markets, segments and countries.

Uwe believes: "As a work-life balance is also key to being ready for a challenging and demanding business environment, I enjoy being with my family, doing any kind of activity, such as handball, flying and playing musical instruments".

Each customer has its own strengths and wants to focus on its core business without any distractions. Combining their expertise with that of Trelleborg Sealing Solutions means customers' businesses can become stronger.

It starts with engineering capabilities; Trelleborg Sealing Solutions has a broad material, design, and solution offering. Next step along the value chain, we have state-of-the-art production sites and the technology to produce samples, small series, or high-volume quantities at the level of quality our customers expect.

Taking a closer look at customers' procurement processes, we can support them with C-part management, vendor consolidation or even supply solutions, such as sub-component assemblies. To these assemblies, we can add additional services, leak testing, laser engraving, magnetic field tests and documentation, for instance.

Finally, we support our customers in the aftermarket with numerous solutions, including packaging, labeling, and cloud-based data consolidation, as well as installation instructions and videos, plus enhanced logistics.

ITG: ServicePLUS experts conduct what you call 'line-walks' to identify potential areas where services can be implemented to simplify or improve a customer's business. What are 'line-walks' and do you have a success story you are particularly proud of?

UH: The 'line-walks' are a great way to build a bridge between digital solutions and services and the good old analog way of doing business face-to-face. It starts with an alignment between Trelleborg and the customer, which results in development of a detailed plan.

Once at the customer, we first carefully discuss the value within the supply chain. The next step is to visit production, following

the flow of goods from goods inward to dispatch. A report is prepared from all our observations, and then we present our findings. We are proud of the positive feedback we've had from participating customers.

I can't share specific examples due to confidentiality, but I can give you an idea of the type of processes we have looked at. One of these is from a goods-in department where a worker typed data into a PC, added information from the warehousing system and printed off labels. The worker then opened the bags we delivered the parts in, repacked the parts in different quantities in different bags and stuck the printed labels on these new bags. As a result, the history and cure date of our products was lost, and the first-in/first-out principle could not be applied.

Together with the customer, we optimized the process. We received all the data the customer required on its labels along with the different quantities per bag needed, implementing a Kanban system with our enhanced logistic service.

ITG: What do you see in the future for ServicePLUS?

UH: We're working on a number of new ServicePLUS offerings. These include the next generation of our 'digital twins' approach, where we create a digital replica of a physical product. This is in addition to Internet of Things (IoT) solutions, RFID technology on Kanban, incorporating more integrated features, enhanced supply chain services, expanded surface technologies and installation tools, for instance.

It is essential we have close contact with the customers to develop and implement the right new services. So, we're always happy if customers contact us about anything along the whole value chain and start a conversation about simplifying their businesses.

ServicePLUS
THE PLUS FOR YOUR BUSINESS

When you partner with Trelleborg Sealing Solutions through our ServicePLUS program, you can focus on your core business while we focus on making sure all your value chain needs are covered. We concentrate on those business activities that typically offer the largest opportunities for saving resources.

TECHNICAL COLLABORATION: Whether starting a new development or enhancing existing products, make use of our experts in materials and design for sealing solutions with optimal application performance. Take advantage of digital tools, sealing technology training and customized seminars to support your technical and commercial teams.

TAILORED PRODUCTION SERVICES: State-of-the-art 3D printing and rapid prototyping help bring your products to market faster. Strengthen your core business processes by outsourcing subcomponent assembly and secondary operations to us.

PACKAGING SOLUTIONS: Our packaging and labeling solutions boost your aftermarket care. Designed to meet your specific needs, including custom tubing for direct insertion into automated feeding stations, bespoke machine-readable labeling for replacement part sets and aftermarket kits directly drop-shipped to your service centers or customers.

SURFACE TECHNOLOGIES: Improve friction characteristics and eliminate sticking with surface modifications, such as Seal-Glide®, to reduce costs in automated assembly and improve application performance. Ensure parts are as clean as they should be for sensitive applications and strict regulations with FlexClean™.

TESTING & QUALITY ASSURANCE: We are all set to run a full suite of material and product tests to improve efficiency and help reduce your inspection expenses. Fully automated inspection cells and quality clinics can verify performance and compliance with standards, along with full documentation.

ADVANCED DELIVERY & STOCK MANAGEMENT SERVICES: Simplify, streamline and enhance your supply chain by letting us manage your important C-parts or benefit from automated ordering services that optimize your replenishment processes and align with production flows.

Want to find out more about ServicePLUS? Scan the QR code or visit trelleborg.com/seals/literature to read the brochure.

Ideal Implant

For women who have undergone a mastectomy or those seeking breast enhancement for aesthetic reasons, breast implants are a critical medical device for their self-esteem and sense of wellbeing. On a quest to bring to market a totally new type of breast implant with an innovative, patented design, Ideal Implant partnered with Trelleborg Healthcare & Medical.

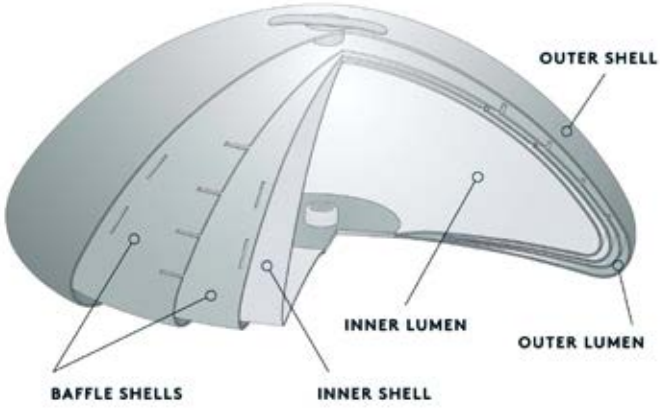
By Mike O'Brien

DR. ROBERT S. HAMAS, RETIRED PLASTIC SURGEON AND FOUNDER, President and CEO of Ideal Implant, spent nearly his entire career in private practice as a plastic surgeon in Dallas, Texas, in the United States. Breast augmentations were a large part of his practice and these were a cause for patient concerns, due to problems common to existing silicone gel-filled or saline-filled implant options.

Silicone gel implants offer a natural look and feel but risk rupture, leading to silicone leaking from the implant into surrounding tissues. Unfortunately, ruptures are “silent” and can only be detected by an MRI or ultrasound scan, which the US FDA recommends patients obtain every two to three years for life.

Saline-filled implants deliver peace of mind because saline is harmlessly absorbed by the body in case of rupture. However, the implants have no structure, resulting in uncontrolled movement of the saline, as it moves around and wrinkles, feeling unnatural.

Dissatisfied with the status quo, Dr. Hamas embarked on a mission to design a totally new type of breast implant. “After years of dealing with silently ruptured silicone gel implants and listening to patient concerns,” says Dr. Hamas, “I realized that women wanted a new type of breast implant – one that would combine the natural feel of a silicone gel implant, but with only saline inside for safety and peace of mind.”



Finding Inspiration

In 1992, Dr. Hamas and his wife were in flight when the plane encountered turbulence. It was nothing out of the ordinary. However, Robert noticed that his beverage, which contained ice, did not slosh around at all, while his wife's, which did not contain ice, splashed out of the glass. Why did the ice control the movement of the liquid? Could that concept be applied to a saline-filled breast implant? Something about that observation clicked for Dr. Hamas, and his mind went to work.

Something about that observation clicked for Dr. Hamas, and he spent the next 14 years developing and testing prototypes that he passionately believed would change women's lives and give them peace of mind by combining the natural look and feel of silicone gel implants with the safety of saline. He simply needed the right manufacturing partner to make his invention a reality. It was at that time, in 2006, that Dr. Hamas officially founded the company, Ideal Implant Incorporated.

Not long thereafter, Dr. Hamas began work with a small manufacturer to help produce this innovative implant. However, it quickly became evident that this firm did not have the manufacturing sophistication and engineering expertise required to develop commercial-scale manufacturing of the product, ensure consistent high quality and ramp up production to meet future demand for large quantities. After a few years of struggling to make headway, Dr. Hamas partnered with Specialty Silicone Fabricators, which Trelleborg acquired in 2016.

A Great Partnership

Working together, Ideal Implant and Trelleborg developed a robust manufacturing process that delivered the superior quality that Dr. Hamas desired. This partnership and close collaboration ultimately brought about FDA approval of the first new type of breast implant in decades, which led to significant sales growth in the United States and Canada.

"Working with Trelleborg, I was impressed that the team consistently looked at the long-term success of our product. They were not focused solely on the bottom line," says Dr. Hamas. "I know that with Trelleborg as a partner, our business is in good hands."

Complex Manufacturing

Ideal Implant's breast implant comprises a series of internal baffle shells nested together and two separate chambers to hold the saline. The unique design controls movement of the saline and supports the shell to reduce collapsing and wrinkling, thought to be the main cause of ruptures. This internal structure is what gives the implant its natural look and feel, so silicone gel is not necessary and women no longer have to be concerned about "silent rupture" and the need for regular MRI scans to detect ruptures.

Manufacturing and assembly are challenges due to the complexity of the implant's design and need for consistent quality. Initially, Trelleborg used Ideal Implant's bespoke manufacturing equipment to produce the implants and then manually assembled the dip molded subassemblies - a process that requires a high level of expertise to ensure quality and consistency. While the Trelleborg Healthcare & Medical team had extensive experience in producing consistent, high-quality subassemblies, the production equipment was not able to meet the increasing demand from surgeons and patients who preferred Ideal Implants.

Preparing for Growth

To gear up for future growth, Trelleborg Healthcare & Medical invested in all new equipment, adding precise automation to ensure high-quality and increased efficiency in the dip-molding process, while ensuring that custom-design elements integral to the Ideal Implant manufacturing process were implemented in the new production system.

Installation and validation of the new equipment is a lengthy process, which could have delayed scale up, potentially for several months. To accelerate the timeline, Trelleborg's engineering team proposed a plan to assemble the implants in-house, using shells and components produced by the original equipment. Ideal Implant approved the proposal, and Trelleborg has assembled implants since the third quarter of 2020, while concurrently managing the new equipment validation process.

Once the validation is complete, the old equipment will be decommissioned and the entire production process conducted in-house at the Trelleborg Healthcare & Medical manufacturing facility in the United States. The new, enhanced manufacturing capabilities will help Ideal Implant meet growing demand in Canada and the United States, while also allowing expansion to other international markets.

Dr. Hamas retired from his medical practice in 2016 and now dedicates 100% of his time to managing the Ideal Implant business. His vision for this novel implant has been realized, and his sights are now set on expanding to Europe and beyond. Trelleborg's global footprint will enable him to do that.

Damping for eMobility

Absorbing vibrations and damping noise created during vehicle operation makes driving a more comfortable experience. Trelleborg Damping Solutions is an expert in eliminating unnecessary and unwanted vibrations through advanced material formulation and innovative laminate technologies.

By Jan Sklucki

ELECTRIC DRIVES AND MOTORS, HVAC AND PUMPS

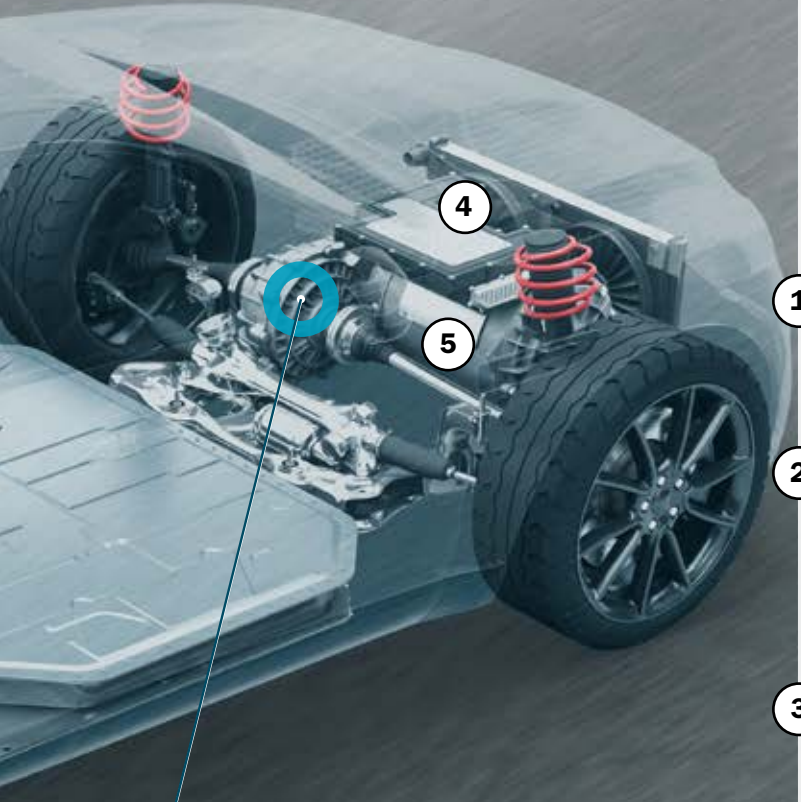
Applied Damping Material (ADM) is applied to surfaces that radiate excessive noise, providing superior damping and reducing vibrations. If isolation is also required, Applied Damping Foam (ADF) combines damping and isolation to reduce structure-borne noise.

COVERS FOR POWER ELECTRONICS, INVERTERS AND ONBOARD CHARGERS

Covers to protect electronic components are frequently sources of resonant vibration. To solve this, Visco-LAM or Duro-LAM materials are shaped using a special laminated process to form a new replacement cover that improves performance without adding mass. If replacement is not possible, ADF or ADM can be applied to existing covers or the housing to give effective damping.

MORE INFORMATION

Scan the QR-Code to learn more about Trelleborg Damping Solutions, or visit www.rubore.com



GEARBOX, GEAR WHEELS

A radial damper combines damping materials with metal gear wheels, reducing tonal and whining noises generated during operation. Many vibrations within the system can be reduced by intercepting the vibration path between different components within the engine assembly.

Trelleborg Damping Solutions

Damping engineers are available to help select the right products to minimize and eliminate problem vibrations. Whether advanced materials, surface treatments or laminated composites, Trelleborg offers unique and customizable solutions to solve customers' most difficult engineering challenges.

REPLACING RESONANT COMPONENTS OR CREATING NEW VIBRATION RESISTANT PRODUCTS

Trelleborg Damping Solutions laminates can replace existing resonant components, such as mounts, brackets, washers and covers. They reduce Noise, Vibration and Harshness (NVH) where it matters most without adding mass, offering robust and complex-shaped design options.

1 **Visco-LAM**
Visco-LAM is an advanced laminate material with an intermediate layer of customizable viscoelastic polymer. By modifying the properties of the polymer and choosing the right metals and alloys, the solution can be tailored to the application.

2 **Duru-LAM**
When a strong and robust material is required, Duru-LAM offers increased media resistance and improved mechanical properties. A range of thicknesses of different metals can be used around an interior layer of elastomer, providing the strength and performance needed to operate effectively within engines and transmissions.

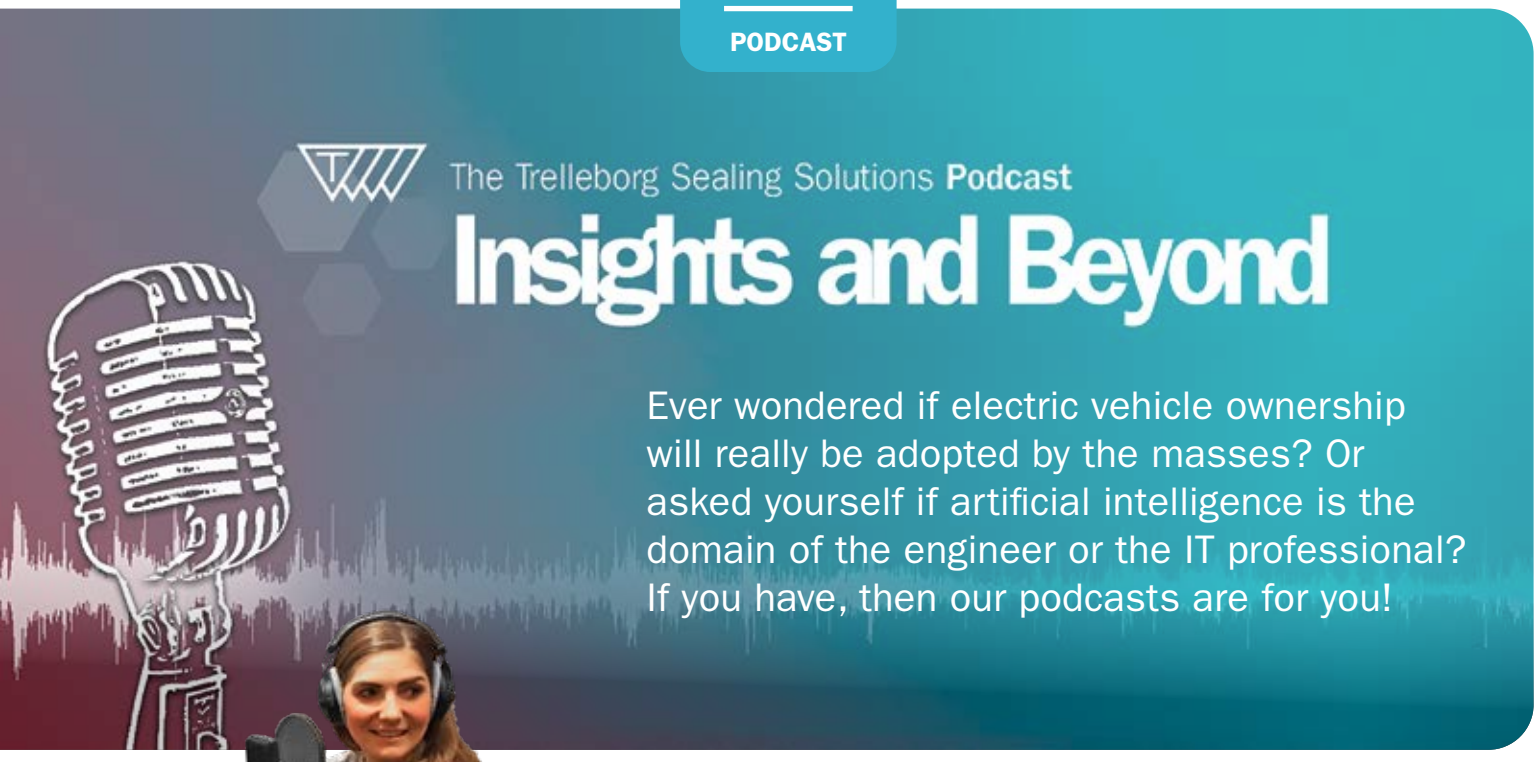
3 **Rub-LAM**
To add sealing properties, components can be formed from two elastomer layers around a metal interior layer. Rub-LAM permits radial dampers, washers, seals and gaskets to be formed with improved noise reduction and damping.

MINIMIZING VIBRATIONS IN EXISTING COMPONENTS

When components can't be replaced, they can be modified with applied solutions to reduce or isolate vibrations.

4 **Applied Damping Material (ADM)**
A constrained layered damping material composed of layers of metal and rubber vulcanized together to form a strong and durable laminate that effectively reduces structural vibrations and radiated noise. It can be cut and formed to fit to most surfaces and shapes using conventional press operations, such as press forming, deep-drawing and die cutting.

5 **Applied Damping Foam (ADF)**
Metal and viscoelastic material are combined with a layer of closed cell foam to combine damping and isolation in a single material. Especially suited for use on stiff structures, such as cast iron or aluminum components, minimizing the radiation from vibrating surfaces.



In our podcasts **SARAH YVONNE ELSSER,** moderator and editor with a passion for technology, talks to Trelleborg experts and guests from business, industry and research about current social and technological trends affecting the polymer industry including digitalization, electrification and sustainability.

TRELLEBORG SEALING SOLUTIONS RELEASED ITS FIRST SERIES OF PODCASTS, 'Insights and Beyond.' The series of four podcasts made available during the end of 2020, covers current issues that affect society today and discuss how polymer technology needs to respond to them.

A focus on AI

The first two podcasts on digitalization focus on artificial intelligence (AI) and feature conversations between Dr. Johannes Kunze von Bischhoffshausen, Director Digital Transformation at Trelleborg Sealing Solutions and two renowned researchers. In the first episode, he discusses with Prof. Dr. Michael M Resch, Director of HLRS High-Performance Computer Center in Stuttgart, Germany, if AI the singularity can make our world a fairer world. In a further episode, he tries to answer the question "Where does AI stand in industry today" with Niklas Kühl, Head of Applied AI in Services Lab, KIT.

Kunze, says: "Sensors are increasingly used in equipment today. For companies that are using the Internet of Things (IoT) and AI in their products and its systems, putting sensors in, capturing the data, and analyzing it, is not the challenge. The real challenge is to make sense of the data and act upon it. Every company needs to have a strategy and build its own individual roadmap for this."

The future of eMobility

The episodes on electrification focus on key issues of eMobility and the first presents discussions between Prof. Dr. Konrad Saur, Vice President Innovation & Technology at Trelleborg Sealing Solutions and Dr. Martin Busche, Farasis Energy Europe. They consider why managing energy and resources is key for future mobility concepts and the question if eMobility can really be sustainable without recycling of resources.

In the second episode, Axel Weimann, Regional Director Automotive Europe & Director Global Segment Automotive, Trucks & Transportation at Trelleborg Sealing Solutions discusses with Stefan von Dobschütz, Managing Director & CCO at Innogy eMobility Solutions, if eMobility will replace all alternatives in the long-term and how sustainable provision of electricity for these vehicles will be.

LISTEN TO THE PODCASTS

"Insights and Beyond"

The four podcasts are available in English and German at https://www.tss-podcasts.com/2, as well as on all platforms where podcasts can be found: Google Podcasts, Spotify, Apple Podcasts, Deezer and Amazon Music.

In Good Taste

COVER STORY

Glancing at the supermarket shelves reveals the wide variety of beverages for sale; a colorful assortment of flavors based on current trends, target groups and seasonal changes. Making sure they all taste as they should is vital. A collaboration between Trelleborg Sealing Solutions and Krones, a specialist in components and lines for beverages, makes sure this goal is met.

By Meghan Cloud Braunger

IN SHORT

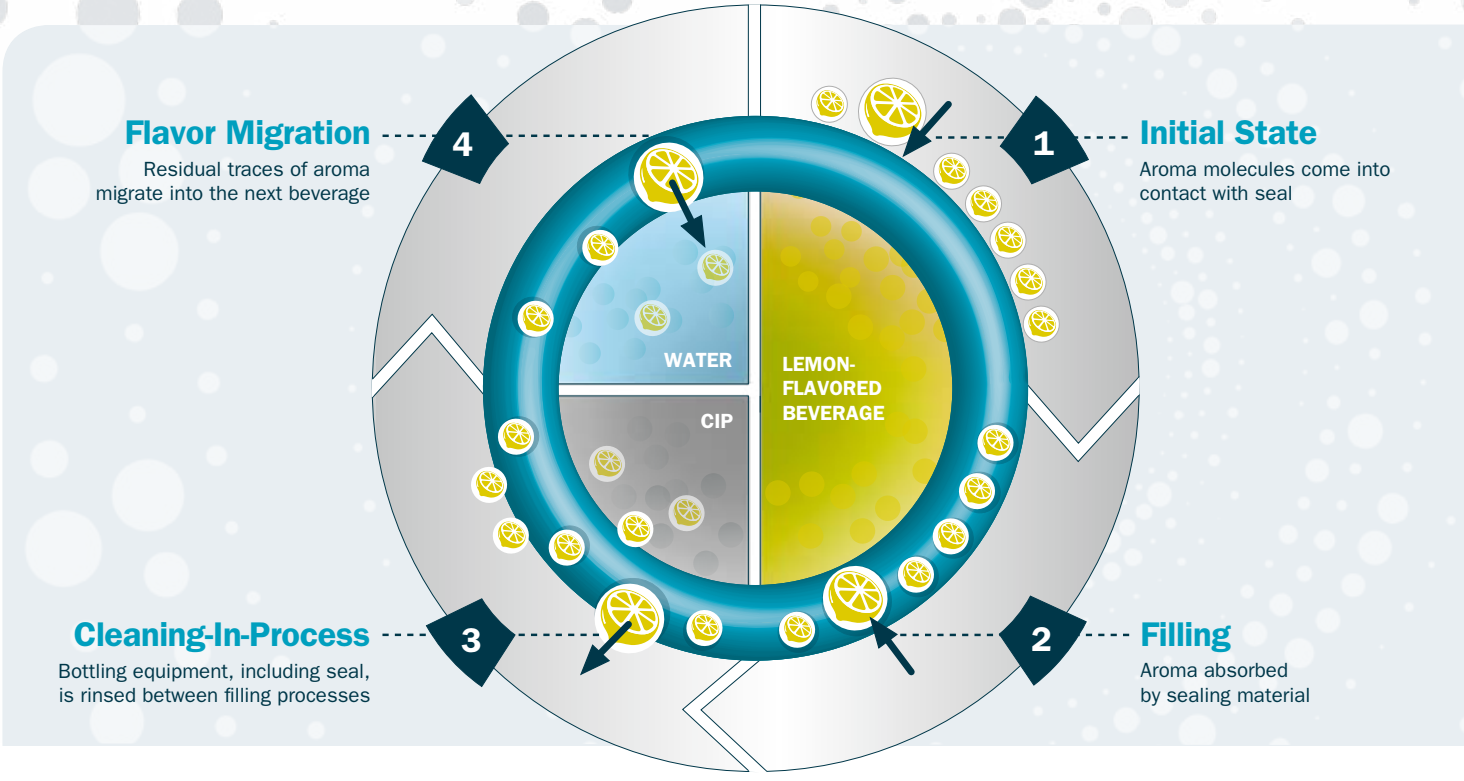
1. Flavor carryover poses a real threat to beverage companies.
2. Trelleborg Sealing Solutions partnered with Krones to identify the cause of, and find solutions to this.
3. Sealing material selection proved to be key in ensuring beverages taste as they should.

IT'S CHALLENGING FOR BEVERAGE COMPANIES TO MEET THE REQUIREMENTS of a market driven by consumer demand. Products are modified rapidly and industry experts predict the beverage market will continue to evolve at increasing speed. Optimizing production, enhancing efficiency and flexibility, as well as maintaining the highest quality standards and food safety, are essential. More and diverse product lines mean manufacturing times are shorter and production changes more frequent. One issue with this is the risk of flavor carryover.

Sealing relevant in aroma carryover

Elastomer sealing components were believed to be a relevant factor in aroma carryover. The selection of an optimum sealing material would potentially be crucial in preventing the transfer of flavors from one filling process to the next. Based on this hypothesis, Trelleborg Sealing Solutions partnered with Krones, a specialist in the beverage bottling process, to analyze the reasons behind unintentional flavor carryover related to seals during the filling process.

Dr. Eva Beierle, Development Engineer Aseptic and Process Technology at Krones, understands the aroma carryover issue from the bottlers' point of view. She says: "One trend in the latest beverages is toward increasingly intense flavors. This poses challenges, since beverages with high concentrations of flavors naturally tend to leave perceptible traces of aroma in the bottling lines." →



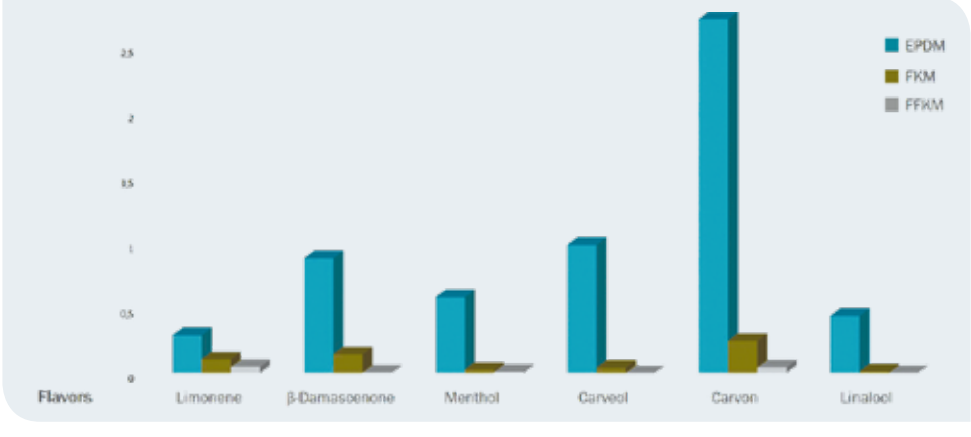
Testing undertaken to identify optimum materials

Together with Krones, Trelleborg Sealing Solutions performed tests to understand where and why aroma carryover occurs in bottling lines. The elastomer materials used in sealing components in filling machines, which are in contact with beverages, proved to be a significant factor. The aromas used for beverages, especially when in high concentrations, diffuse into elastomer materials. The seals can then release the absorbed aromas even after thorough rinsing between beverage filling processes.

Konrad Saur, Vice President Innovation & Technology at Trelleborg Sealing Solutions, says, “The results are clear. Analysis of sealing materials showed that seals made of ethylene propylene diene rubber (EPDM) absorbed more aroma molecules, while fluorocarbon (FKM) materials demonstrated significantly better performance, making it suitable for use with many beverages.”

Isolast® FoodPro™ has virtually no flavor carryover

Tests also concluded that seals made of perfluoroelastomer (FFKM), such as the Trelleborg Sealing Solutions Isolast® FoodPro™ compounds, can be an effective solution. “The Isolast® FoodPro™ materials did not absorb aromas and showed virtually no detectable effect on the taste of subsequent beverages, even under unfavorable conditions. This makes these sealing materials ideal for use on bottling lines processing beverages with intense flavors,” Konrad adds.



Aroma diffusion from materials
EPDM, FKM and FFKM materials were tested with numerous aromas to determine which materials were most effective in preventing carryover.

WHAT IS FLAVOR CARRYOVER?

Flavor carryover is the transfer of flavors from one filling process to the next. Despite cleaning measures and adapted production plans, small traces of aroma can remain in the bottling machines, which can then be absorbed by the next beverage. This danger should not be underestimated, especially when intense flavorings are used.

The consequences of flavor carryover are product rejects, unintentional downtime, additional inspections and complaints. In the worst case, it can even lead to recalls, closures and fines.

Selecting the optimum seal is critical
Martin Krüger, Area Sales Manager responsible for food & beverage at Trelleborg Sealing Solutions, says: “Our customers rely on the performance of the sealing solutions they specify. We can adapt our sealing systems in geometry and material exactly to specific requirements, in particular to fulfill hygienic sealing needs.

“In bottling lines, selecting the optimum seal is proven to be important to prevent aroma carryover. In addition to this, our materials are stable against the chemicals and high temperatures found in bottling lines and those used in CIP and SIP regimes, as well as holding the approvals and complying to standards required for contact with foodstuffs.”

MORE INFORMATION

TECHNICAL PAPER
The technical paper ***Product Change Without Aroma Carryover*** is available in the Technical Library on the Trelleborg Sealing Solutions website.

ABOUT KRONES: AN ALL-ROUND PARTNER FOR THE BEVERAGE AND LIQUID-FOOD INDUSTRY

Whether made of glass, PET or aluminum – Krones machines and lines process millions of bottles, cans and specially shaped bottles each day. Its customers mainly comprise breweries, water, soft drink and juice manufacturers, as well as dairies and producers of wine, sparkling wine and spirits, and companies from the liquid-food field.

Find out more:
https://www.krones.com/en/company/about-us.php

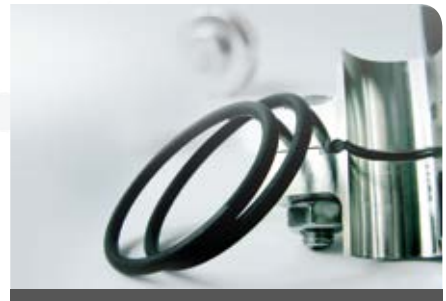
FoodPro™
High-performance elastomer and plastic material range for the Food & Beverage industry

Meets unique needs of the food and beverage industry

The Trelleborg Sealing Solutions FoodPro™ range is a comprehensive portfolio of polymer-based materials specifically designed to meet the unique requirements of the Food & Beverage industry. Implementation of Good Manufacturing Practice ensures the ultimate in production efficiency and safety.

Compliant with global food contact regulations

FoodPro™ materials offer proven high sealing performance and are suitable for CIP/SIP processes used in the food industry. They comply with the most relevant food contact regulations globally, such as the U.S. Food and Drug Administration (FDA) standards, European Regulations including Reg. (EC) 1935/2004 and Chinese food safety standards.



Available for standard and custom-designed seals

The FoodPro™ material range is available for standard and custom-designed seals and components across the globe. Local Trelleborg Sealing Solutions engineers support with seal design to meet hygienic design requirements.

SUSTAINABILITY HIGHLIGHTED AT VIRTUAL CONFERENCE EUROPE

The joint Trelleborg Sealing Solutions and Krones project was featured at the Trelleborg Sealing Solutions Virtual Conference on November 25, 2020. Dr. Eva Beierle, the lead engineer at Krones involved in the aroma carryover R&D project, joined Konrad Saur as a guest speaker in the panel discussion “Engineering Towards a More Sustainable Future.”

Also participating in the sustainability session were Marina Ponti, Global Director of United Nations SDG Action Campaign and keynote speaker Dr. Will Ritzau, Professor for Digital Business Management & Sustainability at University Fresenius in Germany.

Did you miss the Virtual Conference? Recordings of all sessions are available to watch or share with colleagues. https://www.tss-virtualconference.com/

→ **Find out more on page 10**

Speaking your Language

Trelleborg Sealing Solutions offers unmatched levels of engineering, commercial service and technical support, combined with the unique resources, experience and capabilities of an industry leader.

While profiting from our global expertise and unique services, customers around the world are partnering with local engineers to develop customized solutions to meet their individual needs through our Customer Solution Centers worldwide.

At our Customer Solution Centers, we identify solutions that are right for our customers, working closely to ensure their equipment is absolutely best-in-class - all in their local language.

Our extensive product design capabilities, coupled with in-house testing and more than 2,000 proprietary materials, allow Trelleborg Sealing Solutions to be more than a just a supplier, but rather a partner to our customers.

In addition to more than 50 Customer Solution Centers, Trelleborg offers 9 R&D centers and more than 20 manufacturing facilities worldwide to provide world-class service and support to our partners.

Scan the QR code to contact your local Customer Solution Center and to learn more about our locations worldwide

Luxury Sailing

Trelleborg solves an uncomfortable vibration issue for Williams Jet Tenders.

By Jan Sklucki
Images courtesy of Williams Jet Tenders

ABOUT WILLIAMS JET TENDERS

Williams Jet Tenders is the world's leading jet tender specialist, having designed and developed the world's first 4-stroke jet and turbojet range of tenders more than 15 years ago. Founded in 2004 by Roy Parker and brothers, Mathew and John Hornsby, the company employs more than 90 staff and is supported by a team of factory trained engineers across the world.

The company has an 80,000 sq. ft. purpose-built facility in Oxfordshire, England, and each tender is hand-built by a team of dedicated and skilled craftsmen who pride themselves on quality. Each tender also undergoes an on-water test procedure prior to dispatch, ensuring that every aspect of its construction is checked and meets the high standard set by Williams.

WHEN YOU OWN A MULTI-MILLION-POUND YACHT, the ride to shore should not be giving you bad vibrations. This was something Williams Jet Tenders, a UK-based tender manufacturer, wanted to avoid.

Excessive vibrations from a tender's diesel engine can transfer to its hull, leading to a less comfortable ride than might be expected. "Superyachts are the height of luxury and designed from head-to-toe with relaxation in mind; Unwanted vibrations, even on this small part of the journey from land to ship, could really detract from this," says Liam Walsh, Key Accounts Manager at Trelleborg Sealing Solutions.

Connecting with the customer

In search of a solution, Williams Jet Tenders found Southampton-based Race-Tec, a high-performance specialist in this area, which is now part of Trelleborg Sealing Solutions.

Using FEA software, engineers quickly saw that a solution could be provided by a custom elastomeric molding between two housings, situated around the shaft to effectively lessen the vibrations. "Our engineers identified the problem area and applied their expertise. A simple solution to a serious problem," says Liam.

Wider involvement

Next, the wider Southampton facility stepped in and took the solution to the next level. "Using our design, sourcing, assembly and supply solutions, we managed to contribute further improvements to the 'fix' we offered to the customer," continues Liam.

Trelleborg took the molding and turned it into a fully assembled, packaged and final solution for the customer, offering more value than was expected. The assembly includes the tailshaft, halfshaft coupling, bearings, spacers and the original molded components. "All the components were supplied fully assembled to the customer, saving time and costs by removing secondary operations" says Liam.

ABOUT RACE-TEC

In 2019, Trelleborg Sealing Solutions acquired Tri-Tec and its UK operations, Race-Tec, Blue Diamond and Stella-Meta. Race-Tec is well known within the motorsports industry as a high-performance solution supplier, designing and delivering seals for decades. Its close working relationship with customers has taken hundreds of projects from designing, prototyping and testing, all the way through to the delivery of cutting-edge customized seals.

The story continues

"Though this story started a decade ago, it didn't end there," says Liam. "Because of the combined expertise of our Southampton facility and the customer's satisfaction with the assembly, this led to the development of another, further improved assembly."

This new, shorter assembly has the same characteristics as the original development, but, due to its shorter shaft and more compressed coupling area, can be added to other tenders in the customer's range, reducing suppliers and simplifying purchasing. "This cemented the relationship between Trelleborg Sealing Solutions and the customer and expands the opportunities for both parties," says Liam.

The future

A sample order is in process which will allow the product to be launched in its tender in early 2021, and orders have been received for the initial production run. Liam attributes the success of this project to looking beyond the original enquiry and striving to work closely with the customer, adding value where possible: "This is built on the skills and experience of our Southampton team, and we look forward to new opportunities in the future."

What is a tender?
Tenders are small support vessels for superyachts, often used for entertainment or quick transport.

Sealing Solutions for Aircraft Interiors

Trelleborg Sealing Solutions has more than 60 years' of experience sealing aerospace applications, having worked with major manufacturers to take their vehicles to the skies. From small two-seater planes and helicopters, to commercial airlines and spacecraft, Trelleborg's solutions can be found contributing to performance and technology nearly everywhere within the aerospace market.

By Jan Sklucki

PRODUCTS AND SOLUTIONS

Trelleborg Sealing Solutions provides a range of engineered solutions for aircraft cabin interiors. All its solutions are customizable to meet specific requirements and are available in a range of pre-approved materials for rapid deployment.

With the broadest range of capabilities on the market, products can be developed to fit any niche or requirement.

Custom Elastomer Parts

Extruded Polymer Profiles

Combining the experience of the entire Trelleborg Group, engineers have developed a new range of customized extruded profiles to meet the safety and performance requirements for aircraft interiors.

Available in both standard and customized designs, they are approved to all international flame, smoke and toxicity standards. Trelleborg seals can be provided in standard lengths or cut-to-size in colors to match the aircraft's interior.

ENGINEERING AND DESIGN SERVICES

Thermoplastics represent a large portion of the materials found in today's airplanes. Whether reducing weight, increasing life, improving performance or reducing cost, Trelleborg has aided many of its aerospace customers in designing, developing and implementing thermoplastic components for both the interior and exterior of aircraft.

From customer-specified colors and textures, to high temperature and wear resistant parts, Trelleborg offers a wide variety of thermoplastic options.

Custom Thermoplastic Parts

Many applications are hidden away within the aircraft but still serve important purposes. Trelleborg Sealing Solutions can manufacture bespoke components for sealing the fluid, potable and wastewater systems and provide FDA-approved O-Rings and custom geometries to ensure safe food and drinking water aboard the plane.

For maintaining cabin pressure or for use in heating systems, customized diaphragms offer designers tailored performance. Fabric reinforcements let the diaphragms retain their flexibility but enhance their strength and lifetime.

Trelleborg Sealing Solutions can apply its expertise to any stage of the development process. We can operate as anything from a solutions provider all the way to a full development partner, bringing efficient and effective products to market in a record time.

A full range of engineering services can be provided along the product journey. Existing products can be redesigned and optimized to enhance service life or efficiency. Multiple functions and components can be combined into a single part, potentially reducing weight and minimizing the area required. This can be combined with project management, testing and qualification, and installation and assembly services to provide a total solution package.

Let us help you tackle your most important issues:

OPTIMIZING EFFICIENCY
Improve efficiency by saving fuel and reducing weight through material and product innovations.

IMPROVING SAFETY
Durable and effective material options, capable of reliable performance under extreme conditions, are critical to safe operation.

STAYING COMPLIANT
Products meet rigorous safety standards with guaranteed traceability and 100 percent batch testing.

ServicePLUS SUPPORTS YOUR BUSINESS

ServicePLUS can accelerate the performance of aerospace manufacturers.

Trelleborg understands the unique requirements of the aerospace industry. Its range of ServicePLUS solutions match many of the needs of aircraft manufacturers.

In addition to engineering and design, a complete package of accessory services can elevate solutions beyond initial specifications and provide additional benefits.

+ ENGINEERING

OPTIMIZE PRODUCT & APPLICATION PERFORMANCE

ServicePLUS supports a full range of engineering activities

+ ENHANCED SUPPLY CHAIN

STRENGTHEN CORE BUSINESS PROCESSES

ServicePLUS ensures products are available when and how you need them

+ AFTERMARKET

BOOST CUSTOMER CARE

ServicePLUS for the aftermarket ensures your customers get the support they need

+ MANUFACTURING

MAXIMIZE PRODUCTION THROUGHPUT

ServicePLUS streamlines your manufacturing processes

AFTERMARKET SOLUTIONS

A FULL SERVICE OFFERING

Trelleborg Sealing Solutions support does not end with delivery of the components. Instead of a simple parts and inventory service, it takes a comprehensive approach to aftermarket, maintenance repair and overhaul. By taking into account these five important service areas, Trelleborg provides maximum efficiency and benefits, wherever you are in the world.

Technology Applied Damping Material

Keeping Quiet

If you thought electric cars were silent, think again. Electric drivelines are certainly quieter than internal combustion engines, but they have their own noise and vibration issues. Thankfully, new technology from Trelleborg helps ensure a smoother, quieter journey.

By Andrew Montgomery

WHEN ELECTRIC CARS WERE INVENTED, many people thought the noisy world of the internal combustion engine would soon be history. Although electric and hybrid electric cars are quieter, it doesn't mean they're silent.

Electric drivelines have their own range of noise, vibration and harshness issues. And the noise of a typical combustion engine is no longer there to mask other structure-borne noises from the likes of the gearbox housing. But there's also another culprit.

"Power inverters are one of the main contributing sources of noise in the electric vehicles' driveline," says Reine Axelsson, Product Manager for laminates for damping solutions within Trelleborg Sealing Solutions.

Reassuring sound of silence

This worries automotive industry Original Equipment Manufacturers (OEMs) and their component suppliers. E-Mobility is a fast-growing market, and the last thing they need is a noisy car that puts off potential consumers. →

ARVID NORBERG
Director of Sales and Marketing for Trelleborg Damping Solutions

Above: When the noise of a combustion engine is no longer there to mask noises from the gearbox housing or power inverters, innovative solutions are needed.

When a component supplier had a power inverter noise issue, it approached Trelleborg for help.

Trelleborg's solution is based on the same basic technology used for brake shims. It's called Applied Damping Material (ADM), a constrained layer damping material that consists of metal layers that have been vulcanized together with rubber to produce a strong and durable laminate. Together, the polymers, rubber and adhesive are an excellent material to absorb mechanical energy and the vibrations that radiate noise.

It works on all sorts of vibrating structures in automotive drivelines, but Trelleborg has come up with a new variant of ADM for the power inverter issue.

Secret recipe for success

"We've developed a completely new material for inverters because they make a wider range of noise," says Arvid Norberg, Director of Sales and Marketing for damping solutions at Trelleborg. "By combining a different thickness of metal with different types of polymer thickness you can have a higher level of damping at a wider noise frequency and temperature."

The exact material composition is secret. Suffice it to say, the polymers are based on nitryl butadiene rubber (NBR), and the adhesive is typically an acrylic, though other materials can also be involved.

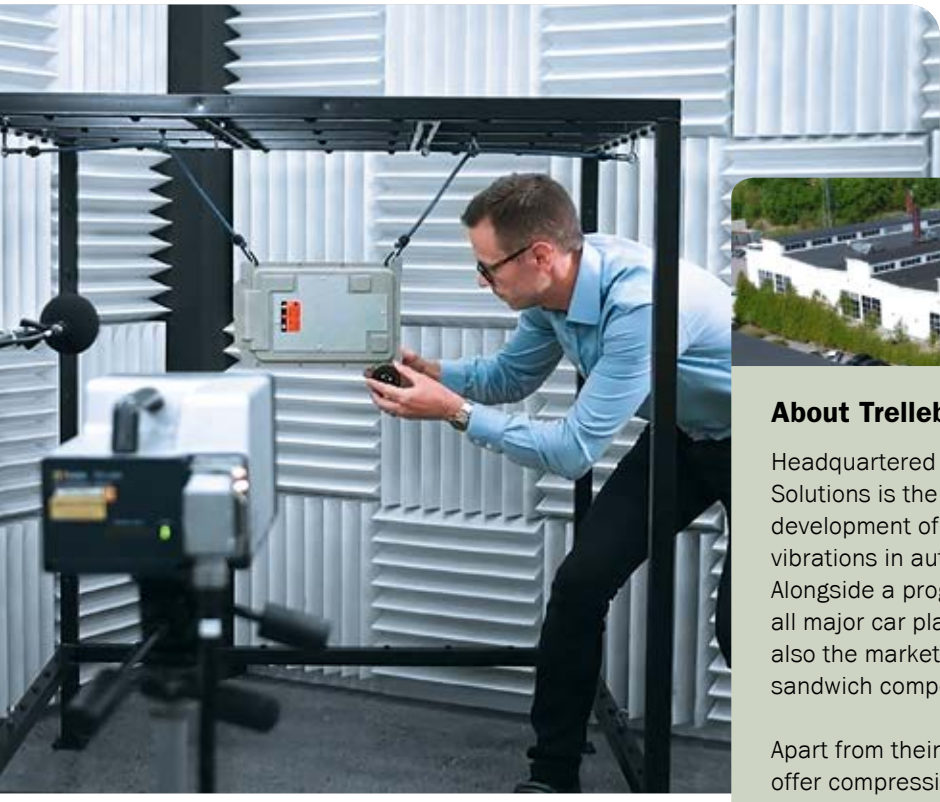
But it's a challenging development process because electrical engines and drives have even tougher cleanliness standards than combustion engines.

"The most critical thing is that there are no loose metallic particles past a certain size, as these can get into the engine or even the electronics and cause a short circuit," Axelsson says. "We are asked to control the level of particles on the parts we supply."

Norberg adds, "We're talking about tenths of millimeters that are often invisible to the naked eye."

Shock and future proof

With the growth of e-mobility, Norberg believes ADM has significant market potential. It underlines the decision of Trelleborg Sealing Solutions several years ago to diversify from brakes and solidify its market-leading position in



Above: Rickard Jonasson, NVH Engineer adjusting the laser vibrometer for testing.

damping solutions. The team working in this area is growing too.

"We are at the forefront of the market, and we see e-Mobility as being very important in the years ahead," says Norberg.

So how will the technology develop?

"We're using more lightweight materials wherever possible," says Axelsson. "Our focus is noise and vibration, but we are also looking to see how we can respond to other new requirements that come from our customers. There are also new workplace directives on noise from the European Union to consider. The health and safety requirements regarding noise and vibration are only getting tougher, but that's good for us as we're regarded as the leading developer of brake and damping products."

With the possibility of this technology being used in other industries, such as consumer electronics, it's clear that ADM has enormous potential, keeping Trelleborg ahead of the competition.

Scan the QR code to watch the film and learn more.

About Trelleborg Damping Solutions

Headquartered in Kalmar, Sweden, Trelleborg Damping Solutions is the world leader in the manufacture and development of products to reduce brake noise and vibrations in automotive OEM and industrial applications. Alongside a program of brake shim solutions that covers all major car platforms available today, the company is also the market leader in the innovation of rubber-to-metal sandwich composites.

Apart from their excellent noise damping, these materials offer compressibility, sealing capacity, strong adhesion and vibration insulation, as well as thermal, chemical and mechanical stress resistance.

FACT

Turn off that noise!

- Sound is a physical disturbance in the surrounding medium in the form of rapid pressure variation.
- Noise is defined as any sound that's perceived to be disturbing. It's audible air pressure, where a very small vibration (in this case, from the power inverter) interacts with the surrounding air to cause a sound wave that eventually reaches the human ear. "It's just like the speaker of a sound system," says Reine Axelsson.
- When something oscillates about a static position, it can be said to vibrate.
- Constrained layer damping works by using a visco-elastic damping layer that is constrained (held down) by a metal layer.
- Vibrations in the structure will cause deformation in the constrained layer.
- Damping occurs due to shear deformation in the damping layer.
- Mechanical energy (vibration) is transferred into a small amount of heat in the damping layer (structural damping).
- Trelleborg's Applied Damping Materials lower the vibration in the structure, reducing the ability to transmit the vibration into the air. "You're lowering the volume of the speaker," says Axelsson.

Pumping Away

As the source of power in a hydraulic system, pumps are critical components. To keep them leak-free and operating effectively, seals are vital. Franco Marano, Trelleborg Sealing Solutions, Global Segment Director Fluid Power, explains why.

By Meghan Cloud Braunger

WE WORK WITH PUMP MANUFACTURERS to maximize the performance of their products. Our engineers work directly with the customer to identify needs and recommend seals based on operating parameters and the media in the pump.

Meeting all pump sealing needs

Pumps are a vital component in any hydraulic system, and they come in a range of different sizes, depending on the demands of the equipment. For example, there are large, high-pressure pumps in mining equipment and delicate, miniature pumps in medical devices.

One function of seals in pumps is to prevent leakage of fluid being pushed through the pump to the rest of the hydraulic system under harsh conditions and high pressures. As hydraulic systems use various media, ensuring chemical compatibility is crucial in a hydraulic system to maintain integrity. For example, the Turcon® Varilip® PDR replaces radial oil seals in aggressive fluids to extend system life.

Supporting customers to develop new products

Many of the sealing solutions we offer for pumps are from our existing extensive seal and material portfolio. But when our customers are working on innovative pump technology, including novel designs or incorporating new media, we can work with them to develop alternative seal geometries and materials.

Depending on customers' needs, our global R&D facilities support with a full range of services, from product and material development to testing. We also offer rapid prototyping services with expedited delivery to provide our customers with seal prototypes for their own test procedures.

Digital tools to support the engineer

The best solutions are based on early consultation between customers and our engineers. Nowadays, when working relationships are more on-line, pump designers can benefit from using our digital tools, all of which are free-to-use. There are a few that I use frequently. Firstly, the Hydraulic System Calculator, which supports engineers with a wide range of calculations. The O-Ring Calculator is one of the most useful tools we offer. Not only does it help people calculate O-Ring and housing dimensions, but it also recommends O-Ring sizes and part numbers, making the specifier's job easier.

TOOLS & APPS FOR DESIGN ENGINEERS

Hydraulic System Calculator
The Hydraulic System Calculator supports people working with hydraulic cylinders, pumps, motors and pipes, and helps them design individual hydraulic components around single-acting or double-acting cylinders. Specific to pump design, and in compliance with global standards, the tool supports the calculation of displacement, flow rate, electric motor power, Reynolds number, pressure drop across orifice and more.

O-Ring Calculator
The O-Ring Calculator helps people easily calculate O-Ring dimensions and the appropriate housing layout in accordance with global standards, and it recommends O-Ring sizes and corresponding part numbers based on installation specifications. The O-Ring Calculator is relevant for a wide range of applications and particularly for fluid power components.

Both tools are free-to-use on trelleborg.com/seals or as mobile apps on the Apple App Store and Google Play.

Pumping solutions

Pumps provide the source of power in hydraulic systems. They use rotation to create fluid flow and generate pressure, which delivers hydraulic energy to the rest of the system. A variety of seals within the pump prevent leakage and contamination from external media entering the hydraulic system. At the same time, they ensure uninhibited function of the pump with low friction and wear. Sealing solutions, optimized for pump applications, can potentially extend the service life of the pump and also the equipment it operates in.

2 Piston seals prevent fluid flow between different sections of a pump. In an axial pump, the swashplate angle is adjusted by a positioning piston. As the flow rate of the pump is determined by this angle, it is critical that the position is precisely controlled.
Typical seal: The **Turcon® Glyd Ring®** is a low friction, abrasion -resistant seal that allows the positioning cylinder to function reliably as needed over a long period of time.

1 Rotary seals are installed in the external drive shaft of an axial piston pump.
Typical seals: **Radial oil seals** prevent leakage from the drive shaft during pump operating cycles and exclude ingress of contamination with an externally facing dust lip.

Turcon® Varilip® PDR offers stick-slip-free running and is suitable for high surface speeds with low pressure. Turcon® material is compatible with a variety of media and operates in a wide temperature range.

The **HP20 rotary oil seal** is an elastomeric seal suitable for sealing medium to high hydraulic oil pressure at low to medium shaft speeds. Available in FKM and HNBR for standard and low temperature environments.

3 Static seals feature at various places in the pump housing to prevent contamination of the system.
Typical seals: **O-Rings** are available in a wide range of elastomer materials for both standard and special applications.

4 Gaskets installed on flanges prevent leakage at connection points, for example, where the pump connects to the pipes.
Typical seal: **HiMod® FlatSeal™ 15**, part of Trelleborg's range of flat gaskets, offers exceptional performance in pump and other hydraulic component applications.

Keeping Compliant

Global Standards for medical devices are continually becoming more stringent. The EU Regulation on Medical Devices 2017/745 (MDR) is one of the most recent changes, and we're helping our customers to stay compliant.

By Donna Guinivan

THE LATEST EU REGULATION ON MEDICAL DEVICES 2017/745 (MDR), which was issued on 5 April, 2017 will go into effect in EU Member States on 26 May 2021. It applies to medical devices, which means any device for human beings that is determined for diagnosis, prevention, monitoring, treatment of diseases, injuries or disabilities, modification of the anatomy or contraception.

A challenging regulation

"Our focus is on supporting our Healthcare & Medical customers to bring products to market faster, while ensuring consistent, reliable supply and the highest quality," says Manuel Funk, Technical Manager at Trelleborg Healthcare & Medical in Europe. "To that end, we've invested significant time and effort in understanding Europe's latest changes to MDR."

"Meeting the regulation is challenging, and it goes hand in hand with complying with other standards that are applicable to medical devices, such as ISO 10993," says Verena Hoerner, Project Development Engineer at Trelleborg Healthcare & Medical.

"Compliance can only be achieved through very careful and close cooperation with all parties involved in the development of a medical device. This is part of our offering to our customers; we provide material expertise to support them in complying with the new, very demanding MDR guidelines and mitigate risk to the highest extent."

Investment in testing

Verena adds, "In complying to MDR, our attention was on material related requirements, like carcinogenic, mutagenic, or reproductive toxic (CMR) substances, endocrine disruptors, phthalates and nanomaterials."

Trelleborg Healthcare & Medical performed extensive testing to examine that its materials support the stringent requirements of the new regulation. This involved cooperation with certified laboratories as well as investment in advanced analytical instrumentation, such as a coupled GC-MS (gas chromatography – mass spectrometry) for extraction studies. Conducting of tests were in worst case scenarios.

Any substances identified were then checked against MDR requirements. Providing this information to customers supports them in making their medical device compliant to EU Regulation on Medical Devices 2017/745, as well as other relevant regulations and standards.

Always working on compliance

"Meeting the latest standards and regulations is vital for us as a supplier to our medical device customers who rely on us to have offerings ready that comply to global requirements. We never rest on our laurels, and once we have satisfied one set of needs, we move onto the next, using our existing material portfolio or newly developed compounds, if required," concludes Manuel.

Above: Materials are tested to meet regulations using leading edge analytical equipment.

ServicePLUS

THE PLUS FOR YOUR BUSINESS

When you partner with Trelleborg Sealing Solutions through our ServicePLUS program, you can focus on your core business while we focus on ensuring all of your value chain needs are covered. We concentrate on business activities that offer the largest resource saving opportunities.

Find out what ServicePLUS can do for your business at www.tss.trelleborg.com/ServicePLUS

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