

NEWS OF THE GLOBAL TRANSPORT TEXTILES INDUSTRY  
— AUTOMOTIVE, AEROSPACE, RAILCAR, MARINE —

## Joyson and KSS complete merger

KEY Safety Systems (KSS), a supplier of safety technology for the transport sector including airbags and seatbelts, has completed its merger with Ningbo Joyson Electronic, creating an automotive supplier business with annual sales of more than US\$3bn and 20,000 employees worldwide.

Joyson, is a multinational company, listed on the Shanghai Stock Exchange, with headquarters in Ningbo, China, and facilities throughout the Americas, Asia and Europe.

Under the terms of the merger, Joyson has acquired the outstanding KSS shares; KSS survives the merger as an indepen-



dent group company headquartered in Sterling Heights, Michigan, USA.

Jason Luo (above, left) will continue to lead KSS as chief executive officer and will also serve as vice chairman. Jeff Wang (right), chairman and founder of Joyson, has been named chairman of KSS.

[www.keysafetyinc.com](http://www.keysafetyinc.com)  
[www.joyson.cn](http://www.joyson.cn)

## Airbus BFE catalogue qualification

In addition to the “wool standard” and “wool/polyamide standard (80/20)” carpet qualities that are already qualified for the Airbus buyer furnished equipment (BFE) catalogue, Lantal Textiles’ “polyamide standard” will be added to the catalogue effective July 2016.

The company’s polyamide carpets are said to be lightweight yet highly robust.

Owing to a new generation of polyamide yarns, they also minimise dirt trapping and are easy to clean.

[www.lantal.com](http://www.lantal.com)

## McLaren car has 40% more carbon fibre

MCLAREN Special Operations, the bespoke division of McLaren Automotive, has announced the creation of the MSO Carbon Series LT.

Based on the manufacturer’s 675LT Spider, the limited-edition Carbon Series LT has been developed with a focus on light weight and optimised aerodynamic performance.



As with the Spider, the front bumper with larger splitter and end plates, front underbody, side skirts, side intakes, lower side intakes, rear body-side lower, rear fenders, rear deck, rear bumper, diffuser and Longtail airbrake are all made with carbon fibre, but with a gloss finish revealing the weave of the material.

However, the MSO Carbon Series LT is also fitted with a gloss-finished carbon fibre electrically retractable roof and tonneau, A-pillars, bonnet and rear deck, side blades, complete front and rear wings, and even fuel filler flap.

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Automotive interiors manufacturing facility in central Mexico

Inteva Products, a Tier 1 automotive supplier of engineered components and systems, is expanding its global manufacturing capabilities with a new 28,000 m<sup>2</sup> operations facility in Guanajuato, Silao, Mexico. Construction began last month.

The new facility is designed to produce interior systems for global automakers with vehicle production near central Mexico.

The initial activity at the plant will involve manufacturing instrument panels and door panels for General Motors' North American truck programme.

Inteva has begun hiring workers and will start component production in 2017.

Founded in 2008, Inteva has continued to grow and now has 46 facilities worldwide.

The company celebrated the opening of a new manufacturing facility in Rychnov, Czech Republic, in April, followed by the opening of a new facility in Oradea, Romania, in May.

In Mexico, Inteva Guanajuato Operations joins two manufacturing facilities in Matamoros, an operations facility in Puebla and a technical centre in Juarez.

[www.intevaproducts.com](http://www.intevaproducts.com)

[www.textilemedia.com](http://www.textilemedia.com)

# Side curtain airbag issues lead to recall

AUTOMOTIVE safety systems supplier Autoliv says it is co-operating with Toyota in the voluntary recall of around 1.4m vehicles of the Toyota Prius and Lexus CT200h.

Seven incidents involving the Toyota Prius have been reported where a side curtain airbag has partially inflated without a deployment signal being given by the airbag controller.

In each of those incidents the vehicles were parked and unoccupied, and there have been no reported injuries.

The root cause analysis of this issue is continuing, says Autoliv. No incidents have been reported in any vehicles produced by the four other original equipment manufacturers that used the same inflator, pointing to vehicle

specific characteristics contributing to the issue in addition to a manufacturing issue.

The inflator manufacturing process suspected of contributing to the issue was changed in January 2012 and the vehicles now recalled by Toyota represent around half of all such inflators manufactured until that time.

Toyota, in conjunction with the USA's National Highway Traffic Safety Administration and the Ministry of Land, Infrastructure, Transport and Tourism in Japan, has concluded that an additional retention bracket will address this issue.

The final cost to Autoliv is expected to be at the lower end of the US\$10-40m range.

[www.autoliv.com](http://www.autoliv.com)  
[www.toyota-global.com](http://www.toyota-global.com)

## Carbon fibre prepreg supply for Airbus

TORAY Industries' Torayca prepreg, which is based on the high-strength and intermediate-modulus T800S carbon fibre, has been approved by Airbus as a material for the primary structure of the A380 aircraft. The Japan-based company has started supplying the material to the Airbus plant in Germany.

Toray signed a long-term basic supply agreement with Airbus Group in May 2010 to supply carbon fibre prepreg for aircraft applications primarily for Airbus; the approval of the Torayca prepreg material is based on this agreement.

Toray has been supplying

Torayca carbon fibre for Airbus aircraft and this is the first time that Airbus will use Torayca prepreg.

In addition, Toray is increasing the supply of its Torayca carbon fibre to the Airbus business.

For instance, the fibre has been selected for the fan case of the PW1100G-JM engine made by Pratt & Whitney – the engine of the A320neo aircraft, which was delivered for the first time in January – and it has also been adopted for the primary structure of this new single-aisle aircraft.

[www.toray.co.jp](http://www.toray.co.jp)  
[www.airbus.com](http://www.airbus.com)

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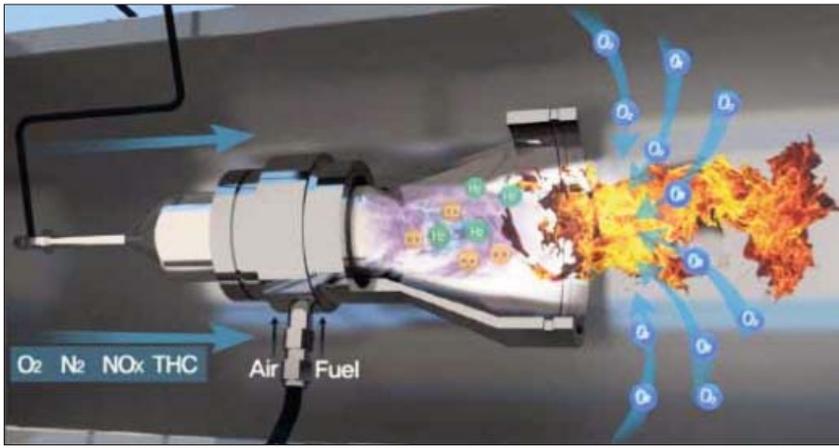


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## Diesel particulate filter developed

THE Korea Institute of Machinery and Materials (KIMM) has developed a new particulate filter that helps reduce diesel soot emissions by up to 95% (reports the Yonhap News Agency).

The South Korean institute said it has completed 60,000-km on-road tests on a diesel car equipped with the newly developed diesel particulate filter (DPF) and a plasma burner.

KIMM said the new system, developed by its Department of Plasma Engineering, could be applied to vehicles next year after winning government certification.

A DPF is a device that removes diesel particulate material (soot) from diesel engine-emitted exhaust gas. It has been used for diesel engines on large cargo trucks and locomotives owing to its big size.

KIMM has made the DPF smaller (about one-tenth in size compared with combustors in general) so the equipment can be installed in passenger cars.

It is capable of exhaust gas combustion even at a low exhaust gas temperature or in poor

conditions of engine operation, unlike existing equipment.

The institute explained that its device can deal with nitrogen oxide emissions, which are regarded as the main cause of smog and ultrafine dust, as well as exhaust gas.

In May, the South Korean government announced a plan to control fine dust, which has recently emerged as one of the biggest threats to public health, as the country has increasingly become more dust-polluted.

It will shut down coal-powered electric power generation plants that have been in operation for more than 40 years and restrict operations of old diesel cars.

Fine dust refers to particles that are smaller than 10  $\mu\text{m}$  and have been known to cause various respiratory problems while also affecting the body's immune system.

The country has been experiencing frequent ultrafine alerts especially in the spring, with people required to refrain from outdoor activities.

[www.kimm.re.kr](http://www.kimm.re.kr)

## McLaren car has 40% more carbon fibre

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In total, the MSO Carbon Series LT features around 40% additional carbon fibre parts

compared with a standard car.

Production begins this autumn, with first deliveries expected before the end of 2016. The 25 units for global sale have already been sold.

[cars.mclaren.com](http://cars.mclaren.com)

## Performance Fibers to expand tyre cord fabric capacity in China

Performance Fibers, which was integrated into Indorama Ventures (IVL) a year ago, is expanding its tyre cord fabric production capacity in China.

The expansion plan was announced after the IVL board approved Performance Fibers' construction of a fully integrated dipping unit adjacent to the current production facility in Kaiping, Guangdong.

The expansion is the first major strategic move by IVL to support the organic growth of Performance Fibers, which is among the leading suppliers of polyester tyre cord fabrics to the tyre industry.

The new unit is expected to commence production in 2018, which will help the company support the expected demand growth of new products developed from various technology platforms.

"The expansion represents an increase in our tyre cord fabric production capacity by over 40% and our commitment to support our customers' growth plan," said Derek Chan, president of Performance Fibers.

Uday Gill, president of Fibers and Yarns, IVL, commented: "Indorama Ventures views the automotive market as a strategic focus of future expansion and we view Performance Fibers to be the growth engine of our automotive business segment.

"Capacity expansion at the current site in Kaiping is a critical first move in our strategic plan while we are investigating how to invest further to increase our global manufacture footprint."

[www.performancefibers.com](http://www.performancefibers.com)

[www.indorama.net](http://www.indorama.net)

## Coats launches 'mini-website' for automotive industry

Industrial thread supplier Coats has launched a new mini-website that provides detailed information on its high-performance threads for the automotive industry, as well as a unique way to submit technical and colour match sample requests.

The site is supported by a digital marketing campaign, targeting original equipment supplier and Tier 1 suppliers, highlighting the company's automotive products, which are used in airbags, seat trim, seatbelts and other applications where thread performance is critical.



The campaign also includes content videos, targeted e-marketing and social media.

The theme "The Details" is reflected in the website's organisation of products and applications, along with technical specifications and sampling opportunities for Coats products.

Designed as mobile responsive and available in English and German, the site is said to be easy for Coats' global customer base to navigate.

[speciality.coats.com/auto](http://speciality.coats.com/auto)

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[www.textilemedia.com](http://www.textilemedia.com)



For the Volvo S90 rear seats, Johnson Controls created a holistic seating experience, not only in terms of the high quality of the seats, but the optimal use of interior space

## JCI supplies seats for Volvo S90

JOHNSON Controls has worked with Volvo to supply seats on the flagship Volvo S90, which will launch in the summer.

The new sedan is said to combine "handsome natural materials with sophisticated, intuitive technologies" that focus on the driver and the design of the interior.

Tony Malila, vice president and general manager, Customer Group Volvo, at Johnson Controls Automotive Seating, said: "Collaborating closely with the team at Volvo, we designed a seat that optimally utilises the vehicle's interior, providing all

occupants with plenty of space and comfort.

"The goal was to make riding in the Volvo S90 feel like driving through the quiet, relaxed calm of the Swedish wilderness."

In addition to the seat covers and upholstery for all of the Volvo S90's seats, Johnson Controls developed the rear seat bench. The company was responsible for its entire development process, from designing and supplying the metal structure to integration.

[www.johnsoncontrols.com](http://www.johnsoncontrols.com)  
[www.volvocars.com](http://www.volvocars.com)



# Euro fluctuations hit Guilford Europe

THE Derbyshire, UK-based European arm of advanced textiles maker Guilford has been hit by currency fluctuations for the second consecutive year, according to recently filed results.



Guilford was established in the US in 1946 as a supplier to the lingerie market.

Part of Lear Corporation since 2012, the company now makes materials used in sportswear and footwear, as well as medical textiles, industrial fabrics and car interiors. Its automotive division supplies such carmakers as BMW, Ford, Nissan and Toyota.

The group's European operation is based in Alfreton, Derbyshire, and employs 400 staff (reports *Insider Media*).

Accounts filed under Guilford Europe showed revenues declined to £68.3m in the year to 31 December 2015 from £79.4m a year earlier; pre-tax profit dropped to £321,000 from £3.7m in 2014.

The group said fluctuations in the value of the euro had negatively impacted its profit and loss results by £1.4m, up from £1.1m last year.

The statement added: "Cost pressures continue in the automotive business and the group continues to focus on product development and cost engineering.

"The directors believe that trading conditions will continue to be challenging in the next financial period, particularly concerning the volatility of the euro."

[www.guilfordtextiles.com](http://www.guilfordtextiles.com)

## Adient takes first steps to secure capital

ADIENT, Johnson Controls' automotive seating and



interiors business that it plans to spin off in October, is initiating discussions with lenders as it takes its first steps in securing its capital structure.

Adient is targeting US\$3.5bn in gross debt, consisting of US\$2bn in bonds and a US\$1.5bn five-year term loan. In addition, the company is targeting a US\$1.5bn revolving credit facility.

"Adient is pursuing a solid and flexible capital structure with strong liquidity to support our robust business plan," said incoming Adient chairman and chief executive officer Bruce McDonald.

"Adient is well positioned for long-term success given its strong market position, improving earnings profile and consistent ability to generate cash."

Adient anticipates that the closing of the new credit facility will occur during the third quarter of 2016.

Completion of the spin-off from Johnson Controls is subject to a number of conditions and remains subject to final approval of the Johnson Controls board.

[www.johnsoncontrols.com](http://www.johnsoncontrols.com)

## German technical textiles merger

TWO Germany-based technical textiles  companies have joined forces to allow business expansion to new markets and markets segments.

Olbo & Mehler Tex (OMT) and Synteen & Lückenhaus (SL) will join activities and business operations under the leadership of a management team headed by Alberto Tavares, current head of OMT.

Both companies are part of the

KAP group holding company, which is listed on the Frankfurt Stock Exchange.

OMT produces technical textiles for the automotive, pharmaceutical, mining, and security and defence industries.

The company was established in Germany in 1930, but in 2014 moved its factory to Vila Nova de Famalicão, Portugal.

SL has a production unit in the Czech Republic and sales offices in Germany and the US.

"We are very excited with this operation," said Tavares. "The combination of these two businesses will define new benchmarks in regards to customer experience and increasing our standards in terms of innovation, efficiency and competitiveness."

The merger of the businesses into one unit will have a consolidated turnover of around €60m.

[www.olbo-mehler.com](http://www.olbo-mehler.com)

[www.synteen.de](http://www.synteen.de)

[www.kap.de](http://www.kap.de)

## Hexcel appoints group president for aeronautics markets

HEXCEL has appointed Thierry Merlot as group president for the European, Asian, Pacific, Middle-Eastern and African aeronautics markets. He has been vice president and general manager since 2010,



Thierry Merlot

A graduate from the Arts et Métiers ParisTech engineering school in 1979, Merlot started his career as composites quality manager at Dassault before joining Hexcel in 1988.

[www.hexcel.com](http://www.hexcel.com)

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## Innovation award for antioxidant for PU

MILLIKEN has won the EURO-PUR Innovation Award for its Milliguard AOX-1 polymer-bound antioxidant for polyurethane (PU).

The product is said to give the automotive industry a solution for compliance with toughening indoor air quality standards for vehicles.

EUROPUR, the European association of flexible polyurethane foam blocks manufacturers, created this award to recognise excellence and professionalism in the flexible PU foam industry.

Antoni Puig, product line manager, EMEA – PU Colorants & Additives, and Sven De Vis, European technical manager, accepted the award on behalf of Milliken last month at the 50th anniversary celebration of EUROPUR in Brussels, Belgium.

Jesse Shoultz, global market manager for Performance Colorants & Ingredients at Milliken,



said: “This patented solution enables polyol producers and foam manufacturers to create interior vehicle components that meet automotive original equipment manufacturers’ stringent requirements for improved indoor air quality.”

Milliguard AOX-1 antioxidant promotes compliance with emerging indoor air quality standards, such as China’s passenger car air quality assessment guidelines, by contributing negligible volatile organic compound (VOC) and outgassing condensation (FOG) content in emissions

testing.

The product is also said to deliver “unparalleled efficiency” in stabilising free radicals that can degrade PU foam.

It interacts synergistically with other antioxidant classes and also reacts earlier in the oxidation cycle.

Milliguard AOX-1 antioxidant can be used for manufacturing interior vehicle components, such as seats, door trim, carpet, instrument panels, headliners and consoles – with reduced VOC emissions.

The company says it also contributes to sustainability by enhancing the performance of natural oil polyols (NOPs) and non-halogenated flame retardants.

It encourages use of NOPs by eliminating concerns about out-of-control auto-oxidation that can cause discoloration.

Similarly, this antioxidant has been proven to stabilise non-halogenated flame retardants, reducing both discoloration and phenol emissions.

[www.millikenchemical.com](http://www.millikenchemical.com)  
[www.europur.org](http://www.europur.org)

## 3D woven textile composites in the UK aerospace industry

THE Breakthrough Aerospace Materials (BAM) project commenced in March 2016 with funding from Innovate UK.

This three-year Aerospace Technology Institute (ATI) project looks to advance the manufacturing techniques and simulation of three-dimensional (3D) textiles in the UK and to make them commercially available to the aerospace industry.

Currently, the use of 3D textile composites is held back by a lack of analysis techniques that are able to accurately predict weave architectures and the resulting processing and structural performance.

Led by Sigmatex, BAM joins UK-based aerospace companies

BAE Systems and Rolls-Royce along with ESI, MSC Software, Antich & Sons, M Wright & Sons, Teledyne CML Composites and three UK universities involved in 3D woven technology – Nottingham, Manchester and Bristol.

The expected benefits of the project will include structural lightweighting, reduced manufacturing and inherent assembly costs.

The project will identify and address the barriers that limit the scope of use and market penetra-

tion of 3D textiles.

Suitable components and features will be investigated and used to develop and validate predictive software for the simulation of 3D textiles.

Manufacturing processes will be assessed and optimised to manufacture various elements of a typical test pyramid to compare simulation predictions with component performance.

[www.sigmatex.com/bam](http://www.sigmatex.com/bam)  
[www.innovateuk.gov.uk](http://www.innovateuk.gov.uk)  
[www.ati.org.uk](http://www.ati.org.uk)



# Carbon fibre in the automotive industry

IN 2015, the global market for carbon fibre reached about US\$1.8bn and is expected to maintain a high growth rate of around 11% over the next five years.

The automotive industry is showing fast rising demand for carbon fibre reinforced polymer (CFRP) in particular.

According to a report published in *JEC Asia Business Review*, by 2020 almost a quarter of CFRP is expected to be found in automotive applications.

Manufacturers already using CFRP include BMW, Mercedes-Benz, Ferrari, Lamborghini, General Motors, Ford and Toyota.

For example, CFRP will be used in the BMW i-Series of electric and plug-in hybrid cars, and with the new BMW 7 Series, CFRP will be incorporated into the car body using a hybrid construction method.

Another example was displayed at the SAE International 2016 World Congress and Exhibition in Detroit, Michigan, USA, where Toyota unveiled its Deep Orange 6 concept vehicle, which features carbon fabrics in its door panels, rear hatch, dashboard, bumpers and cladding.

## Key drivers

Key drivers are global regulations to reduce carbon dioxide (CO<sub>2</sub>) emissions in the road transport sector, which means reducing fuel consumption.

This can be achieved in a number of ways, such as optimising the powertrain, improving the drag coefficient, reducing rolling resistance, etc., but significant weight reductions can also be gained by using different materials, such as carbon fibre.

How significant these reductions can be is evident from re-

search conducted by Inovev, a worldwide automotive knowledge platform that specialises in economic and technical information for the automotive industry.

Inovev calculated that a 100 g weight reduction in a vehicle results in a 8.5-10 g/km reduction in CO<sub>2</sub> emissions.

Over the past three decades the average weight of cars has increased virtually every year, from just over 1,000 kg in 1990 to a little less than 1,400 kg in 2012.

The reasons include improved safety, environmental protection, comfort and convenience for drivers and passengers.

These improvements required reinforcements and many new functions.

However, in 2013 the average mass of cars declined for the first time and continued falling in 2014 and 2015.

This corresponded with carmakers beginning to produce cars with a significant amount of CFRP, an ultralight material that offers excellent strength-to-

weight ratios, as well as high corrosion resistance and favourable workability.

## CFRP research

In 2015, Inovev conducted a study focusing on the future use of CFRP by five German car manufacturers: Audi, Mercedes-Benz, BMW, Porsche and Volkswagen.

It analysed current production vehicles and concept vehicles, and investigated forthcoming new models, platforms and versions coming out in the next five years.

Inovev also conducted interviews with 33 executives from carmakers, suppliers and independent technical centres.

The research threw up some interesting observations. Within their current range, the manufacturers have identified medium-series vehicles that are well suited to the first-time or increased use of CFRP.

BMW is likely to remain the leader in CFRP use, but Audi and Mercedes have concrete plans to use CFRP in the near future.

The main parts to be produced with CFRP are body-shell reinforcements, drive shafts, seats,

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Toyota's Deep Orange 6 concept vehicle

# Carver Non-Woven Technologies starts up manufacturing facility

CARVER Non-Woven Technologies, a subsidiary of custom compression moulder and compounder R3 Composites, will start up its new manufacturing facility in Fremont, Indiana, USA, on 1 July.

Two weeks later it will be in full commercial production of single- and multi-material non-woven products for both R3 and the North American composites industry.

The new plant is situated on a 7.3-hectare site in a building that is 15,329 m<sup>2</sup> in size, providing room for expansion depending on future demand.

"We are very proud of the amount of flexibility, new technology and custom-modified equipment this new facility represents," said Mark Glidden, president of R3 Composites and Carver Non-Woven Technologies.

"To achieve this level of competence right from the start, our organisation has made a substantial US\$13m investment.

"If our products really take off the way we believe they will, then our five-year plan calls for us to make an additional US\$20m investment to expand our operations."

## Fully automated

Carver's new production line is fully automated, from initial debaling, fibre opening, blending and carding, through to finished packaging.

As a result, the company can produce nonwovens with low-variance weight (density) as well as superior dimensional stability and mechanical properties.

Carver says this results in nonwovens that are more consistent and mechanically more efficient (i.e. a lower density nonwoven can be used in a given composite



part without sacrificing tolerances or mass).

This, in turn, can have the follow-on benefits of reducing both cost and mass of finished applications in either thermoset or thermoplastic composites.

## Fibre types

Carver works with a wide range of fibre types, including E-glass fibre, bast fibre (e.g. tossa jute and others), carbon fibre, basalt fibre and thermoplastic fibre, including virgin and 100% recycled polyethylene terephthalate, polyamide, polypropylene, polylactic acid, and high- and low-density polyethylene (HDPE and LDPE).

The company offers carbon fibre needled nonwovens in a multitude of blends at "considerably lower" costs than with conventional wrap-and-resonate processes.

During nonwovens production, the fleece mats are typically coated with thermoset binder resins, including an acrylic/latex binder, which itself confers unique properties including specific colorants when the mats are subsequently impregnated with thermoset resins prior to forming.

Carver's dual-web configuration enables it to formulate products using different binder types, including the novel option of combining two different resin formulations in a single-fibre architecture.

## Flexibility

High levels of flexibility have been designed into the new facility to allow the company to be able to respond to customer needs by offering products with

areal weights of 300-2,400 g/m<sup>2</sup> using numerous fibre types, blends and layering.

Carver can achieve blend ratios from 80%/20% to 20%/80% for natural fibres and other fibres (such as fibreglass, polymeric fibres or even carbon fibre).

The production system is capable of simultaneously running up to six different fibre types, all of which can be commingled either in a single layer or in a structure featuring up to three different fibre types each on the top and bottom sides of the nonwoven mat.

For greater design flexibility, these hybrid fibre combinations may be the same or different areal weight depending on customer requirements.

An application in which hybrid mats are increasingly used is automotive underbody shields, where high-impact polymeric fibres are used on the road-facing side and a hybrid mixture of more structural and acoustic fibres (including glass, carbon, basalt, polyester and/or natural fibres) are used on the vehicle-facing side of the nonwoven architecture.

## State-of-the art technologies

The new production facility features state-of-the-art technologies, including the latest developments in fibre opening, blending, carding, cross-lapping, web drafting, web scanning and needling.

For example, the Hyperpunch needle loom technology developed by Dilo Group of Germany eliminates drag on the fleece in the machine direction during its dwell time in the needles, which in turn can lead to pulling and shrinkage of the fleece in the cross-machine direction, causing

unevenness and dimensional changes to the batt.

The technology is said to allow for faster needling (both fine and finish) and higher throughput, hence more economical production of needled fine fleeces.

Other benefits include better

fibre entanglement, a more even felt surface with smaller needle holes, significantly lower needle wear and negligible needle breakage, better retention of the web's strength and less damage to the carrier fabric.

Carver says it is the first non-

wovens manufacturer to apply Hyperpunch technology to the production of natural fibre non-wovens, which has helped these products achieve values of 90+ in automotive fogging tests for interior components.

[www.r3composites.com](http://www.r3composites.com)

## Carbon fibre in the automotive industry

*continued from page 7*

spoilers and trunk lids.

The German carmakers also identified that lowering their process costs through automation is also vital.

In this respect they are being supported by a number of intensive research and development (R&D) programmes.

These programmes aim to reduce the cost of carbon fibre as well as the processing costs by replacing thermosets with fluid or reactive thermoplastics, using high productivity processes, such as sheet moulding compound (SMC), automating all the levels of production, reducing production scrap and recycling CFRP.

### Potential market

Inovev's conclusion is that the use of CFRP in cars manufactured by German premium carmakers is expected to increase significantly.

However, the growth rate for these vehicles and the use of CFRP in lower range vehicles

will depend on the first series of production and the R&D programmes.

There is every reason to believe that automotive manufacturers in other regions will follow this trend, says JEC.

In addition, the increasing number of automotive applications for CFRP is a development that many polymer companies are following with interest.

As the R&D involved is likely to be costly, JEC expects to see consolidations, collaborations and alliances being formed between the major carbon fibre manufacturers in the coming years.

### Asia-Pacific

Asian companies play a hugely significant role in the global carbon fibre market.

The top three companies are Japanese and together account for 55% of estimated capacity, with Toray Industries alone accounting for 35% of the market.

When China, South Korea and Taiwan are added to the equation, Asia-Pacific currently manufactures nearly 70% of the

world's carbon fibre.

To meet growing demand, the leading manufacturers in this region are rapidly increasing their production capacities.

Japan's Toray and Teijin, as well as companies in China and South Korea, are investing in new facilities.

Mitsubishi Rayon, an affiliate of the Japanese original equipment manufacturer Mitsubishi, is planning a joint venture with Continental Structural Plastics to develop carbon fibre pillars and panels for North American vehicles.

China – the world's biggest car market – is bringing in more government funding for CFRP.

Toray's carbon fibres have already been used in Toyota's fuel-cell production vehicle, the Mirai, for structural parts, fuel cells and high-pressure hydrogen tanks.

South Korea's Hyosung has developed carbon fibres for use in Hyundai's Intrado concept car for the car frame, hood and side panels.

[www.inovev.com](http://www.inovev.com)

## Quickstep signs MoU with French naval shipbuilder

QUICKSTEP Holdings, a manufacturer of advanced carbon fibre composites, has signed a new memorandum of understanding (MoU) with French naval shipbuilding company DCNS Group.

The MoU is for the companies' joint co-operation in the manufacturing of components and assemblies using advanced composite materials.

DCNS was recently selected by the Australian government as its preferred international partner for the design of 12 submarines for the Royal Australian Navy.

A Quickstep/DCNS committee will consider the parts and projects most relevant to implementation of Quickstep's technology and during the next 12 months Quickstep expects to develop and manufacture a number of

demonstration parts.

The company says composites are already used in naval and commercial ships for such purposes as superstructures, bulkheads, propellers and interior panels.

[www.quickstep.com.au](http://www.quickstep.com.au)  
[dcnsgroup.com](http://dcnsgroup.com)

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# Thermoplastic and nonwoven composites: trends to 2020

THERMOPLASTIC and nonwoven composites are enjoying high growth, according to Dr George Kellie of UK-based Kellie Solutions.

Speaking at the Interiors Innovation & Design Forum at last month's Automotive Interiors Expo in Stuttgart, Germany, Kellie explained that the development of innovations in lightweight composites is being driven by vehicle weight reduction.

The most visible automotive composites are carbon fibre reinforced plastic produced by such converting processes as resin transfer moulding (RTM) and sheet moulding compound.

He said thermoplastic composites potentially offer faster cycle times than thermosets, but there needs to be improved recyclability at end of life.

Other thermoplastic composites techniques, such as thermoforming and extrusion coating/lamination, are growing, while exciting new three-dimensional techniques are emerging.

Kellie noted that nonwovens generally started to replace traditional materials in the automotive industry in the 1990s, such as the use of paperboard for boot linings; mostly these were highly visible applications.

By the 2000s, nonwovens began being used as performance products and composites, such as headliners. Weight reduction became the key issue, finish became more important and the use of recycled materials became



Acoustics measurements at Autoneum's facility in Roßdorf-Gundernhausen, Germany

an option.

In the current decade, nonwovens are seen as contributing to vehicle performance, such as fuel economy, and are being used in technology end-uses, for example, in fuel cells and underbody components, with natural fibre materials now being considered.

In future, nonwovens may be viewed as technology components and a key material in electric vehicle programmes as part of a cradle-to-cradle design.

Automotive is currently the leading sector for technical nonwovens with a market share of 35% by value.

In 2015, the volume of automotive nonwovens produced was around 2.5bn m<sup>2</sup>, which is forecast to rise to 3.5bn m<sup>2</sup> in 2020 and 5bn m<sup>2</sup> in 2025.

By 2020, it is predicted that interiors will account for 48% of automotive nonwovens, underbody 15%, filtration 11%, battery separators 10%, engine bay 10% and other end-uses 6%.

Meanwhile, the highest growth application for automotive

nonwovens is for underbody, followed by engine bay, filtration, battery separators, composites, acoustics and carpets.

Besides weight savings, other market drivers that are favouring the use of composites and nonwovens include aesthetics, carbon dioxide emissions/fuel consumption, legislation/safety, noise, vibration and harshness/acoustics, environmental issues and cost.

## Key benefits

Composite components are now being used to replace parts previously made of metal. They are also replacing plastic parts that do not have significant acoustic properties.

The key benefit of composite components is their light weight; they can also be moulded and produced with special surface finishes and other features.

In the mid-1990s, needle-punched nonwovens were developed by Borgers for use as wheel arch liners. The nonwoven composite technology has been further developed for undershields,

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such as used on the latest Ford Focus models.

The aim is to replace heavy-weight polyvinyl chloride or other solid plastic layers to achieve weight reduction with high rigidity.

Audi, BMW, Ford, Volkswagen and Porsche are reported to have switched to nonwovens for their undershields.

Kellie explained that the EU is currently discussing major reductions in noise thresholds for new cars, which is expected to become mandatory by 2019.

New "pass-by" noise regula-

tions in Europe and industry demands for improved acoustic comfort has resulted in the development of acoustic heatshields, particularly in engine bay and underbody applications.

These structures are laminates, typically manufactured from long-strand glass-fibre needlefelt fabric with one side faced with reinforced aluminium foil. They aim to reduce interior and exterior vehicle noise, particularly high frequencies.

Reinforcements are also becoming more sophisticated. For example, Formax, a manufactur-

er of bespoke lightweight multi-axial reinforcements, has introduced a range of biaxial fabrics made from intermediate-modulus carbon fibre.

The  $-45^{\circ}/+45^{\circ}$  biaxials have been developed for the manufacture of structural composite parts. Typically, these new lightweight fabrics are available in weights of 200 g/m<sup>2</sup> and 300 g/m<sup>2</sup> and can be used for prepreg, RTM, infusion and wet lay-up composite processes.

[www.kelliesolutions.co.uk](http://www.kelliesolutions.co.uk)  
[www.automotive-interiors-expo.com](http://www.automotive-interiors-expo.com)

## Structural weight-saving technologies using natural fibres

BCOMP in conjunction with a partner has developed a range of grid fabrics for automotive composite applications.

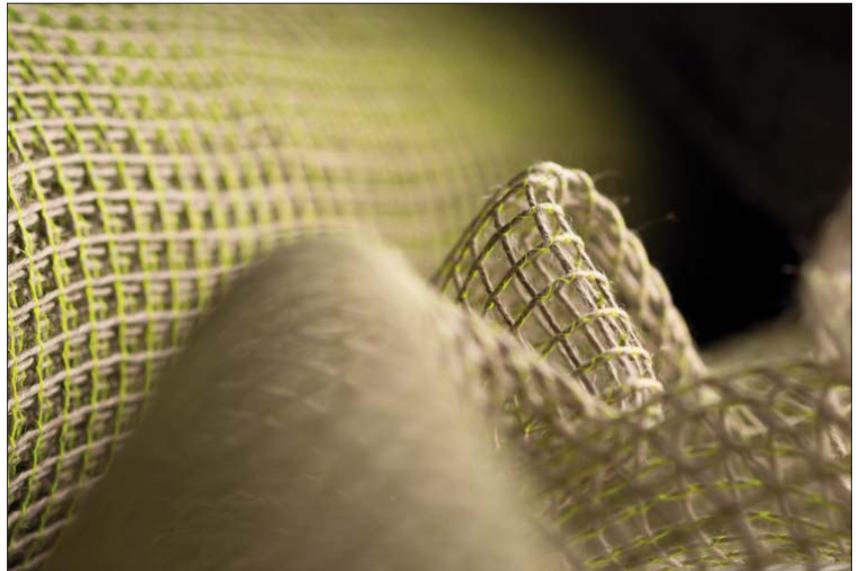
The Switzerland-based company's PowerRibs technology is based on the concept of "leaf veins", which rigidify a surface with minimum weight.

In place of the veins are "ribs" made with flax fibres to reinforce thin-walled structures, resulting in a "pseudo mini sandwich", since no core material is involved.

The PowerRibs architecture uses high-quality flax fibres with a unique stiffness-to-weight ratio. The roving twist is optimised for maximum rib stiffness and compression strength, and mesh size and roving thickness can be tailored.

PowerRibs are said to triple the flexural stiffness of thin-walled structures without adding weight. As a result, cost and weight can be reduced when making composite parts and damping properties can be increased by up to 250%.

For a composite part, a large proportion of the synthetic fibres,



such as glass fibres or carbon fibres, can be replaced with this novel material, increasing the part's bio-based material content.

The ribs can be combined with any type of base fabrics, such as natural fibre, glass fibre or carbon fibre reinforcements. Further, PowerRibs fabrics can be processed with common vacuum moulding techniques.

Bcomp has partnered with processing technology partners, such as TWE-Isowood for auto-

otive composites, to develop concepts for the mass production of PowerRibs parts.

Depending on the final application, two processing technologies are currently available: a thermoplastic version for interior automotive parts and luggage shells and a thermoset-based version for the production of automotive body and space parts.

[www.bcomp.ch](http://www.bcomp.ch)  
[www.twe-group.com](http://www.twe-group.com)  
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## Hexcel invests in additive manufacturing

Hexcel has made a strategic investment in Oxford Performance Materials (OPM), which produces thermoplastic, carbon fibre reinforced three-dimensional (3D) printed parts for commercial aerospace and space and defence applications. OPM is said to be the only company producing 3D printed polyetherketoneketone-based products in the market, including strong, lightweight parts for space, defence and commercial aircraft.

Scott DeFelice, OPM's chairman and chief executive officer, said: "Hexcel's investment will help enable us to further expand production capacity to meet rapidly growing market demand for our Oxfab technology."

OPM is privately owned and based in South Windsor, Connecticut, USA.

[www.hexcel.com](http://www.hexcel.com)  
[www.oxfordpm.com](http://www.oxfordpm.com)

# Automotive focus at Dornbirn conference

FIBRES and textiles in automotive will be one of the key topics of the 55th Dornbirn Man-made Fibers Congress, which will be held in Dornbirn, Austria, from 20-22 September.

The event is expecting around 800 researchers and technicians in the man-made fibre industry from 30 countries, together with a growing number of participants from retail and brands.

The congress will feature more than 100 lectures, almost half from industry (and over 10% from Japan). Other topics include: fibres for nonwovens; fibre innovations; finishing and functional additives; and textiles.

Groz-Beckert, a provider of industrial machine needles, precision parts and fine tools as well as systems and services for the production of fabrics, will present TexCar – a longitudinally cut vehicle of a major European auto brand in original size – in

the foyer of the congress centre to demonstrate the various aspects of fibre usage in the automotive sector. The bi-annual meeting of the Textiles in Automotive working group will also take place in Dornbirn.

On the day before the congress opening, around 15 young researchers nominated by the sponsors will hold a Young Scientist Forum organised by Austrian industry consultants Syngroup.

A high-calibre panel discussion will conclude the plenary session on the opening day. This will be led by global consulting company Gherzi and include chief executive officers and directors of leading fibre producers Indorama, Lenzing, Advansa, Fisipe, Märkische Faser and Dralon, who will discuss Asia's dominance in the fibre industry and how the economic environment will change in the future.

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# Automotive Composites

### The make-or-break decade for carbon and natural fibres

FIBRE-based composites are becoming increasingly important in the manufacture of automotive components.

These new materials look set to continue their penetration of the automotive sector, and their large-scale use in mass-production cars, trucks and other vehicles is being widely predicted.

But there are several reasons why advanced composites have not been more widely adopted by the automotive industry.

The key stumbling block is price, while the availability and future supply of carbon fibres is another issue being addressed by fibre producers.

Many companies, from carbon fibre suppliers through to original equipment manufacturers, are now entering the market,

with a wave of partnerships and joint ventures announced over recent months.

*Automotive Composites: The make-or-break decade for carbon and natural fibres* reviews the use of composites in the automotive sector and assesses how far these materials are from being used in mass vehicle production.

Written by Adrian Wilson, this in-depth report with around 220 pages and more than 60 tables, provides a sustainable roadmap for the automotive composites industry for the next decade and beyond, including profiles of key suppliers and users.

● This new report from TMS was published in September 2015. The publication price is £495 GBP (print or PDF format).

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