VOICES
RADICIGROUP INFORMATION MAGAZINE

RadiciGroup for Automotive

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Performance, safety and lower costs, plus comfort, durability and sustainability. These are the keywords guiding RadiciGroup in developing materials for the automotive market: from engineering plastics for high-performance components to fibres for interior panels providing vehicle comfort and safety.

The automotive sector requires versatile, high-performance products suitable for numerous needs and, what is more, products meeting ever more stringent parameters for safety and containment of CO₂ emissions. For many years, the Group has produced a sustainable offering for automotive and many other industries: from r-PET and 30%-vegetable-origin polyester to polyamide 6.10, made from 65% biological resources. The path forward for the automotive market is laid out. Europe has to adapt to the widespread awareness of sustainability that has also been affecting other sectors at the global level – sectors with demanding requirements where RadiciGroup has already left its mark.

Prestazione, sicurezza e riduzione dei costi ma anche comfort, durabilità e sostenibilità. Sono queste le parole chiave che guidano RadiciGroup nel mettere a punto materiali destinati al mercato automobilistico: dai tecnopolimeri per componenti ad alte performance, alle fibre per i rivestimenti interni, per il comfort e per la sicurezza del veicolo. Un settore, quello dell’automotive, che richiede prodotti versatili, ad elevate prestazioni, adatti per molteplici esigenze, ma anche che rispettino i sempre più stringenti parametri di sicurezza e di contenimento delle emissioni di CO₂. Da tempo il Gruppo lavora a un’offerta sostenibile, anche per il settore automobilistico. Dal poliestere r-PET ad elevate prestazioni, fino ai poliammidi 6.10 che per il 65% sono di origine bio. La strada per il mercato dell’automotive è tracciata: l’Europa dovrà adeguarsi al panorama di sensibilizzazione sul fronte sostenibilità che ha coinvolto anche gli altri settori a livello globale – settori con richieste più stringenti e in cui RadiciGroup ha già lasciato il segno.

Sustainability: the path forward for the automotive market is laid out | Sostenibilità: la strada per il mercato dell’automotive è tracciata
Today, in the automotive industry, metal replacement and lightweighting of components are always on the agenda, as they directly affect vehicle performance and consumption. In this context, the producers of raw materials play a very important role, both in researching more suitable materials and in conducting simulations to determine the level of performance the materials can guarantee a vehicle. Such R&D work was carried out by the team of RadiciGroup Performance Plastics, Joma-Polytec GmbH and Daimler AG in developing a valve body assembly and elbow to connect the oil pump to the crankcase.

RadiciGroup proposed the use of a glass-fibre-filled polyamide as an alternative to metal. The product, trade named Radilon® S RV350W 339 BK, is a heat-stabilized PA6-GF35 that provides high heat resistance during prolonged exposure to hot air and hot engine oil.

The result? A reduction of 0.256 kg in the weight of the valve body and elbow, which in turn contributed to a decrease in fuel consumption.

Production processes:
› Standard injection moulding + fusible cores
› Ultrasonic welding + hot plate welding of rivets

Characteristics of the polyamide components in contact with air and motor oil:
› Guaranteed to operate for 1.2 million km of travelling
› Can withstand about 15,000 hours of exposure to high temperatures (130°C)

Nel settore automobilistico è all’ordine del giorno parlare di sostituzione dei metalli e alleggerimento dei componenti: incide sulle prestazioni del veicolo e anche sui consumi. In questa contesto i produttori di materie prime giocano un ruolo importantissimo: sia nello studio dei materiali più idonei sia nella simulazione delle prestazioni che quegli stessi materiali potranno garantire al veicolo. Questo è quello che ha fatto RadiciGroup Performance Plastics in squadra con Joma-Polytec GmbH e Daimler AG nel mettere a punto corpo valvola e gomito per collegare la pampa dell’olio al carter.

RadiciGroup ha proposto una poliammide caricata fibra vetro come materiale alternativo al metallo. Il prodotto, il Radilon® S RV350W 339 BK è una PA6-GF35 stabilizzata al calore che garantisce elevata resistenza termica per esposizione prolungata al contatto con aria calda e olio motore. Il risultato? Una riduzione del peso del corpo valvola e del gomito di 0.256 Kg che contribuisce a sua volta a una riduzione dei consumi di carburante.

Processi di produzione utilizzati:
› Stampaggio ad iniezione standard + anime fusibili
› Saldatura a ultrasuoni + saldatura dei rivetti a lama calda

Caratteristiche dei componenti in contatto con aria e olio motore:
› Garantire la funzionalità dei componenti in poliammide per una percorrenza fino a 1,25 milioni di km
› Resistenza a circa 15.000 ore di esposizione a temperature elevate (130°C)
Talking about sustainable mobility is easy. But when electric or hybrid vehicles are the topic, there is a wealth of know-how behind them. And in this field, one of the active players is RadiciGroup Performance Plastics Business Area, which has been engaged in the production of engineering plastics for almost 40 years and now develops products with special characteristics studied ad hoc for applications in this new sector.

To understand how RadiciGroup contributes to the market of electric vehicles and hybrids, let us begin with the Group’s collaboration with a long-time customer, SCAME SpA, a specialist in electrical solutions. The result of the teamwork between the two companies was a charging outlet for electric car batteries, made from the Group’s Radiflam®, a halogen- and red phosphorus-free flame-retardant compound. The UL-94 V0-classified material was chosen because it enhances the safety of components in case of flames and is not subject to degradation even after prolonged exposure outdoors.

Besides its materials for charging outlets and plugs, RadiciGroup Performance Plastics offers products for battery covers, battery cooling lines, mains connectors and control units. And the ever increasing presence of hybrid and electric motors gives RadiciGroup new opportunities for products, keeping in mind that electric cars require materials ensuring a high level of protection for electrical/electronic circuits. This is why the Group focuses on the development of halogen- and phosphorus-free self-extinguishing materials, which are already in use today by a number of carmakers. Moreover, some materials have been designed to ensure additional protection for electrical circuits, as a result of special formulations that show limited substance migration.

Si fa presto a parlare di mobilità sostenibile. Ma quando il riferimento è ai veicoli elettrici o ibridi, c’è dietro un mondo. E qui si colloca anche il lavoro di RadiciGroup Performance Plastics, l’Area di Business del Gruppo che da quasi 40 anni è attiva nella produzione dei tecnopolimeri, ora anche con particolari caratteristiche studiate ad hoc per applicazioni in questo “nuovo settore”.

Partiamo da una collaborazione con uno storico cliente, la SCAME SpA specializzata in soluzioni elettriche, per capire cosa mette a disposizione RadiciGroup al mercato dei veicoli elettrici e ibridi. Dal lavoro coniunto tra le due aziende è nata una presa per la ricarica delle batterie di auto elettriche che è stata realizzata con un compound a marchio Radiflam® riduttore alla fiamma, esente da alogeni e fosforo rosso. Il materiale, classificato UL-94 V0 è stato scelto perché aumenta la sicurezza dei componenti in caso di sviluppo di fiamma e per la sua attitudine a non degradarsi anche a seguito di esposizione prolungata all’esterno.

On top of materials, RadiciGroup Performance Plastics can offer its OEM and TIER 1 customers continuous support through its CAE service – advanced calculation systems to assess the feasibility of an application before production. The advantage? A considerable cost and time savings!

E-MOBILITY? PERFORMANCE AND SAFETY, THANKS TO RADICIGROUP ENGINEERING PLASTICS

E-MOBILITY? PERFORMANCE & E SICUREZZA GRAZIE AI TECNOPOLIMERI RADICIGROUP

CASE HISTORY
**The Paris Agreement on Climate Change**
Accordo di Parigi sui cambiamenti climatici
Global warming goals: ≤ 2 °C by 2050 (compared to the earth’s temperature in the pre-industrial age)
Objective: to avoid a temperature rise of ≥ 1.5 °C above the pre-industrial temperature in the 21st century

**CO2 Emission Reduction**
Reduzione emissione CO2
Improved air quality in heavily urbanized areas
Qualità dell’aria nelle aree a forte urbanizzazione

**Improved Air Quality in Heavy Urbanized Areas**
Qualità dell’aria nelle aree a forte urbanizzazione

**Introduction of Hybrid and Electric Engines**
Introduzione motori ibridi ed elettrici
Hybrid and Electric Vehicles (HEV): potential CO2 reduction vs ICE (Internal Combustion Engine): 50%
Battery Electric Vehicles (BEV): Zero emissions

**Electric Vehicles and CO2 Reduction Goals**
Veicoli elettrici e obiettivi di riduzione CO2

**Performance Plastics**
Safeguarding the Environment and Electric Vehicles
Salvaguardia dell’ambiente e dei veicoli elettrici

**The RadiciGroup way to the Circular Economy**
Produzione
Raccogliendo e riciclando i materiali
Raccomandando e riciclando gli imballaggi

**A Compulsory Choice to Achieve CO2 Reduction Objectives**
Una scelta obbligatoria per raggiungere gli obiettivi di riduzione CO2

**Eiffel Tower**

**Introduction of Hybrid and Electric Engines**
Introduzione motori ibridi ed elettrici

**The IAE (International Energy Agency) maintains that 600 million electric vehicles will be needed by 2040**
IEA (International Energy Agency) sostiene che nel mondo serviranno 600 milioni di EV entro il 2040 (relativo alla temperatura della terra dai tempi pre-industriali)

**Annual Global Light Duty Vehicles Sales**
Vendite annuali di veicoli commerciali leggeri

**The Paris Agreement on Climate Change**
Accordo di Parigi sui cambiamenti climatici
Global warming goals: ≤ 2 °C by 2030 (compared to the earth’s temperature in the pre-industrial age)
Objective: to avoid a temperature rise of ≥ 1.5 °C above the pre-industrial temperature in the 21st century

**Emission Reduction**
Riduzione emissione CO2
Improved air quality in heavily urbanized areas
Qualità dell’aria nelle aree a forte urbanizzazione

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In the automotive industry, the nonwoven fabric spunbond is mainly used in three applications: seat padding backing, airbags and car covers, and sound absorbing panels. To better understand the product features and performance, as well as new items in the spunbond range, Voices interviewed Francesca Pedrini, product manager of Tessiture Pietro Radici (TPR), a RadiciGroup company specializing in the manufacture of Dylar® nonwovens.

Automotive is a very demanding industry in terms of performance. What does TPR offer this market?

Our Dylar® nonwovens demonstrate high tensile strength, tear resistance and elongation at break, characteristics that give the final product better performance. In the case of outdoor applications, such as protective car covers, another key aspect is UV stabilization, so that the nonwoven maintains its specific properties over time. While, for interior uses of spunbond – here I’m primarily referring to airbag covers – customers demand flame retardant characteristics and increasingly lower VOC/FOG emissions. When combined with other materials during the processing phase, Dylar® ensures good weldability and workability of the various layers.

Currently, what are the most important applications for your spunbond products?

A large part of our products are for customers engaged in lamination, the bonding of spunbond with a protective film to provide resistance to atmospheric agents. This process is used for car covers, in addition to seat covers with a lower count.

Who are your customers?

Our customers are companies who bond or process our products for subsequent direct or indirect manufacturing at their final customers (TIER 1 or TIER 2 companies, but also sometimes OEMs). For the most part, our customers are based in Europe, except for the cases where we deal directly with their non-European subsidiaries.
You’ve recently started up a new production line. What are its main characteristics?

It’s a new plant for bicomponent fibre that endows nonwovens with better homogeneity and industrial performance. TPR has invested EUR 11 million, so as to become even more competitive by enhancing its product range to meet the demands of new markets.

Will this line make new products available to the automotive industry?

Yes, as we can select two different kinds of embossing, we’ve invested in 3D capability to create a three-dimensional nonwoven combining mechanical performance with greater softness. This innovation for car covers, for instance, can meet the entire gamut of our customers’ needs.

Di recente avete avviato una nuova linea. Quali sono le sue principali caratteristiche?

Si tratta di un impianto con tipologia di fibra bicomponente che garantisce una superiore omogeneità al non tessuto con una migliore prestazione industriale. TPR ha investito 11 milioni di euro per essere ancora più competitiva, allargare la sua gamma prodotti e poter così soddisfare nuovi mercati.

Questa linea può mettere a disposizione nuovi prodotti per l’automotive?

Sì, grazie alla possibilità di selezionare due differenti goffrature abbiamo investito nell’opzione 3D creando un non tessuto tridimensionale che possa congiungere le prestazioni meccaniche a una maggiore morbidezza del prodotto. Questa innovazione, ad esempio nell’applicazione car cover, potrebbe coprire tutta la gamma fabbisogno del nostro cliente.

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A more stringent regulatory framework on sustainability would help. Indeed, the limited regulations in force today offer a very simplified equation: sustainability equals lower emissions. This is not the complete picture. Sustainability equals lower emissions, part recycling, the full lifecycle.

Nowadays, large investments are being made in engines in order to achieve one goal: lightweighting. Weight needs to be decreased to reduce consumption, in accordance with European Union regulations, which have set a limit for 2021, when the target of 95 grams of CO\(_2\) emissions per kilometre should be reached. But there is a risk that manufacturers of high-powered cars with large engines will end up outside the law.

For this reason, the latter are preparing themselves with everything electric, precisely to enter the new segment. This demonstrates that, given the strict regulations, carmakers are racing to get ready, despite bearing higher costs.

SUSTAINABILITY

SUSTAINABILITY-AUTOMOTIVE: A CONFIRMED RELATIONSHIP IN EUROPE?

SOSTENIBILITÀ-AUTOMOTIVE: UN BINOMIO COLLAUDATO IN EUROPA?

Un quadro normativo più stringente in fatto di sostenibilità automobilistica: il limite delle normative in vigore oggi, infatti, è che offrono un binomio molto semplificato: sostenibilità uguale riduzione delle emissioni. Non è così. Sostenibilità uguale riduzione delle emissioni, riciclabilità delle parti, lifecycle per intero.

Oggi i grandi investimenti sono rivolti alla parte motrice e vanno in un’unica direzione: la riduzione del peso. Bisogna diminuire il peso perché la necessità è quella di abbassare i consumi in vista delle imposizioni della Commissione europea, che ha stabilito dei limiti per cui nel 2021 si dovrà arrivare a 95 grammi per chilometro di emissione di CO\(_2\), con il rischio, per le gamme delle case automobilistiche che hanno grosse cilindrate e grosse potenze, di finire fuori legge.

Ecco perché il comparto si sta attrezzando con l’elettrico, proprio per rimanere in quella fascia. Questo dimostra che in presenza di un quadro normativo severo le case automobilistiche corrono ad attrezzarsi sopportando anche costi maggiori.

Manufactured using recycled raw materials: such materials, in the light of circular economy, find a second life after a mechanical recycling process and turn into high performance polymers.

- Heramid\textsuperscript{®} PA6 and PA6.6 engineering plastics
- r-Starlight\textsuperscript{®} polyester textile yarn
- r-Radyarn\textsuperscript{®} polyester textile yarn

Manufactured using clean energy, mainly hydroelectric power.

- Radiflor\textsuperscript{®} PA6, PA6.6 and PA6.10 polymers
- Radilon\textsuperscript{®} PA6 and PA6.6 engineering plastics
- Heramid\textsuperscript{®} PA6 and PA6.6 engineering plastics
- Radiflor\textsuperscript{®} PA6 and PA6.6 BCF yarn
- Radigreen\textsuperscript{®} PA artificial grass yarn
- Radison\textsuperscript{®} staple fibre, PA6 staple
- Radiflor\textsuperscript{®} PA6 and PA6.6 textile yarn

Manufactured using biopolymers obtained from renewable source materials not in competition with vegetable food cultivations.

- Radiflor\textsuperscript{®} PA6.10-based engineering plastics
- Dorin\textsuperscript{®} 6.10 PA6.10-based textile yarns
- Biofeel\textsuperscript{®} Bio-based textile yarns
- Radiflor\textsuperscript{®} 6.10 Bio-based textile yarns
- CornLeaf\textsuperscript{®} Ingeo\textsuperscript{™} polylactic acid (PLA) yarn

Solution-dyed, saving water and energy thanks to dyeing pigments added directly during the polymer extrusion phase.

- Radiflor\textsuperscript{®} PA6 BCF yarn
- Radiflor\textsuperscript{®} 6-10 Bio-based BCF yarn
- Dorin\textsuperscript{®} PA6 staple
- Radison\textsuperscript{®} staple fibre PA6 staple
- Radiflor\textsuperscript{®} PA6 and PA6.6 textile yarn
- Radigrande\textsuperscript{®} polyester textile yarn
- r-Radyarn\textsuperscript{®}/r-Starlight\textsuperscript{®} recycled polyester textile yarn
- Biofeel\textsuperscript{®} Bio-based textile yarns
- CornLeaf\textsuperscript{®} Ingeo\textsuperscript{™} polylactic acid (PLA) yarn

Recyclable products which, in a circular economy perspective, can be used as secondary raw materials after a recycling process.

- All products
The RadiciGroup Performance Yarn Business Area, specializing in the manufacture of PA 6 and PA 6.10 BCF yarn, presented at the 2018 Global Fiber Congress (Dornbirn, 12-14 September 2018) to share its field experience in the circular economy, as well as new trends in the automotive industry, two of the topics at centre stage. About 700 specialists coming from 30 countries participated at the 57th edition of the event, where over 100 lectures took stock of the situation in the evolving fibre world.

RadiciGroup produces innovative synthetic fibres that meet the needs of a constantly changing market, increasingly more demanding from a performance viewpoint. And the Group is strongly focused on a circular approach to business. The Group's message for the entire production chain revolves around the concept of mechanical recycling: synthetic fibres, especially those with high physical-mechanical properties, can be recycled at the end of their useful life, for example, for new technical and industrial uses.

The Group offers PA 6 and PA 6.10 yarns which blend lightness, durability, design, sustainability and reduced cost to meet the requirements of new trends. From electric autos to autonomous driving cars, car interiors are studied in great detail with the goal of offering comfortable spaces to enjoy as entertainment centres. Based on RadiciGroup's know-how and its customers' experience, PA 6 or PA 6.10 BCF tufted carpets are the best solution for the automotive industry because they ensure quality, performance and easy maintenance with remarkable cost efficiency, thanks to the focused effort of the Performance Yarn Business Area.

Another speciality of the business area is the capability to develop yarn in custom colours and in small quantities to meet the varied requests of customers. Moreover, due to environmental restrictions, customers today can no longer manufacture carpet from raw yarn and then dye the finished product. Thus the solution is to opt for solution-dyed yarn, a choice that not only meets design and performance needs, but is also more environmentally sustainable, as it uses less water.
Transparency and clarity are the operative words that have always guided the RadiciGroup Comfort Fibres Business Area on the path to certification for its polyester yarn made from recovered materials.

The r-Radyarn® and r-Starlight® products – UNI 11505-certified since 2014 – achieved Global Recycled Standard (GRS) certification in September 2018. GRS is promoted by Textile Exchange, a non-profit organization that operates internationally to further responsible and sustainable development in the textile industry.

The GRS certificates obtained by RadiciGroup cover two families of products: raw and yarn-dyed 95% r-PET and solution-dyed 85% r-PET.

The decision to pursue GRS certification was made to meet market demand and move toward total supply chain traceability.

Compliance with GRS requirements allows the Group to provide a third-party-verified report with every delivery of r-Starlight® and r-Radyarn®, certifying the content and the origin of the recycled materials used to make the product, as well as its compliance with the environmental and social requirements of the entire supply chain.

Thus product requirements (covered by UNI 11505) are complemented by system requirements. The GRS-certified products are in conformity with the Manufacturing Restricted Substances List (MSRL) compiled within the Zero Discharge of Hazardous Chemicals (ZDHC) Programme, an initiative with the objective of eliminating hazardous chemical substances in the textile industry.

The GRS certification applies to the entire range of r-Starlight® and r-Radyarn® products, including those for the automotive industry used primarily to make fabric for car seats and interior panels.

RadiciGroup // Con oltre 3.000 dipendenti, un fatturato di 1.147 milioni di euro nel 2017 e un network di unità produttive e sedi commerciali dislocate tra Europa, Nord e Sud America e Asia, RadiciGroup è oggi leader mondiale nella produzione di una vasta gamma di intermedi chimici, polimeri di poliammide, tecnopolimeri, fibre sintetiche e non tessuti. Prodotti realizzati grazie ad un know-how chimico d’eccellenza e all’integrazione verticale nella filiera della poliammide, sviluppati per impieghi nell’ambito di molteplici settori industriali tra cui: AUTOMOTIVE - ELETTRICO/ELETTRONICO - BENI DI CONSUMO - ABBIGLIAMENTO - ARREDAMENTO - EDILIZIA - ELETTRODOMESTICI - SPORT. Alla base della strategia di RadiciGroup, forte attenzione all’innovazione, alla qualità, alla soddisfazione dei clienti e ai temi della sostenibilità sociale e ambientale. Con le sue macro Aree di Business - Specialty Chemicals, Performance Plastics e Synthetic Fibres & Nonwovens (Performance Yarn, Comfort Fibres, Extrusion Yarn) - RadiciGroup è parte di una più ampia struttura industriale che include anche il business meccanotessile (ITEMA) e quelli dell’energia (GEOGREEN) e dell’Hotellerie (SAN MARCO)