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## **Borealis extends its Fibremod™ technology portfolio with high performance carbon fibre reinforced polypropylene compounds**

**New polypropylene carbon fibre reinforced solutions fulfil the automotive market's requirement for engineering materials enabling lightweight construction while delivering high performance and excellent economic efficiency**

Borealis, a leading provider of innovative solutions in the fields of polyolefins, base chemicals and fertilizers, announces the extension of its Fibremod™ technology portfolio with carbon fibre reinforced polypropylene grades. Borealis' leading-edge Fibremod technology portfolio has a proven track record in realising weight reduction in many automotive applications and is now expanded with Fibremod™ Carbon, a carbon fibre reinforced polypropylene. This innovative portfolio extension will help the automotive industry to reap the benefits of carbon fibre reinforced plastics, such as outstanding density to weight ratio, significant weight reduction potential, and increased functionalisation and modularisation of components. The excellent economic efficiency of the Fibremod Carbon portfolio will also promote the more widespread use of this potentially revolutionary material in the mass production of automobiles.

**Fibremod Carbon: light weight, stiffness, strength and competitiveness combined in one material**

Driven by the aim to reduce fuel consumption and overall operating cost, the aircraft industry has been a pioneer in lightweight construction using Carbon Fibre Reinforced Plastics (CFRP). CFRP have also found an important niche in high-end sports cars and motorsport vehicles.

With ever increasing demands for improved fuel economy, these materials are also finding their way into everyday passenger cars. European Union regulations to reduce CO<sub>2</sub> emissions for new cars to 95g/km on average by 2020 and the US Corporate Average Fuel Economy (CAFE) standard, which aims to

increase the mileage of new car models from 39 to 60 miles per gallon (17 to 26 kilometres per litre) by 2025, have created a new sense of urgency for lightweight construction.

OEMs and Tiers continue to allocate a high proportion of their R&D budgets to develop new ideas for lightweight construction in high volume car production. Borealis took up this challenge and underpins its position as supplier of choice for the automotive industry by offering a differentiated solution. The use of carbon fibre leads to a significant increase in stiffness compared to traditional glass fibre construction. Fibremod Carbon compounds provide stiffness not seen before in polypropylene, reaching up to 20,000 megapascal (MPa), combined with an extraordinarily low density. Specific stiffness is a way of comparing the density and stiffness of different materials to determine the most effective solution. It is the established method to evaluate benefits to optimise lightweight construction. In this comparison, Fibremod Carbon outperforms even lightweight metals like aluminium or magnesium, leading to a lightweighting potential of more than 60 percent compared to steel. In practice, this means that components can be developed with similar or even higher stiffness and lower weight. For structural parts, the geometry can be adapted to best utilise the gain in stiffness, resulting in further weight-saving potential.

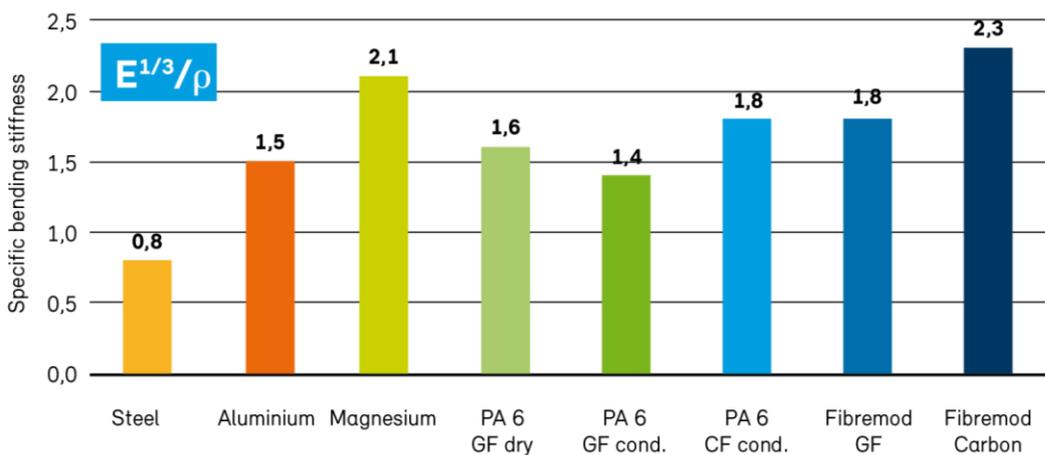


Image: Specific bending stiffness of Fibremod with glass fibre (GF) and carbon fibre (CF) compared to traditionally used lightweight metals and polyamide (PA) solutions. © Borealis.

## Fibremod Carbon makes lightweight construction with carbon fibre affordable

The Borealis Fibremod Carbon technology portfolio is a highly cost-effective alternative to other engineering polymers, high performance polymers or even lightweight metals. The same weight reduction can be achieved with Fibremod Carbon as with leading materials such as magnesium or carbon fibre reinforced polyamide, with the additional benefits of no contact corrosion, no moisture absorption and suitability for economic injection moulding processes, while at the same time incurring only half of the costs compared to traditional materials. Compared to aluminium, the cost benefit is still significant; a comparison to PA6-GF30 shows neutral cost advantage, but a weight reduction potential of more than 30 percent.

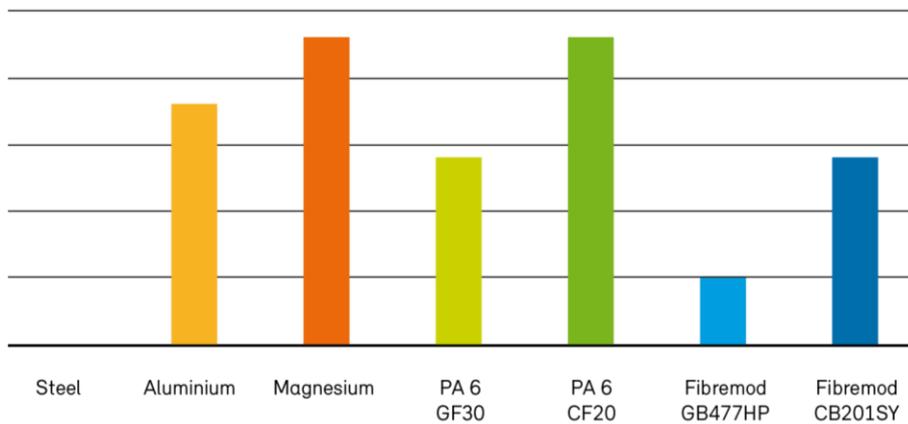


Image: Relative Material Cost Increase per Kilogram of Weight Savings comparing traditionally used materials such as metals, polyamide (PA) with Fibremod. © Borealis.

## Borealis Fibremod technology reduces development time and costs

Because carbon fibre reinforced PP grades are by nature complex, they require extensive engineering. For this reason, Borealis has developed computer-aided methods to predict fibre orientation and distribution, thus allowing for an integrative simulation of the final application performance. Borealis has also established state-of-the-art testing methods and standards for fibre reinforced PP and is fully committed to further enhancing its modelling and simulation methodologies. This means Borealis can provide comprehensive support to its customers in developing and implementing new lightweight solutions based on Fibremod Carbon; expensive prototyping and physical testing of the final application can be reduced to a minimum.

“Building on our proven track record of Value Creation through Innovation, we are going to offer a new generation of high performance lightweight materials through the extension of our cutting-edge Fibremod technology portfolio,” says Nicholas Kolesch, Borealis Head of Marketing Automotive. “By utilising the Borealis Fibremod technology and building on the experience of hundreds of engineering projects in the last decade, Borealis is helping the automotive industry to further reduce weight, development cycles and costs.”

## Fibremod Carbon – a revolutionary grade portfolio

Three new grades will augment the already cutting-edge Fibremod portfolio:

- Fibremod™ CB201SY: a 20% carbon fibre reinforced engineering PP boasting a maximized performance strength-to-weight saving ratio
- Fibremod™ CB301SY: a 30% carbon fibre reinforced engineering PP offering up to 40% weight saving potential when compared to other lightweight materials currently in use
- Fibremod™ CB401SY: a 40% carbon fibre reinforced engineering PP providing ultra-high stiffness, thus enabling lighter weight, high performance plastics applications

These new grades are especially suited for applications such as chain adjusters, pump housings, headlamp housings, oil pans, seat frames, arm rests, gear shifting gates and sunroof frames. Also being explored are applications in structural parts in interiors, under-the-bonnet applications, and motorcycle parts.

**Visit our microsite to learn more about how Borealis and Borouge are Driving Tomorrow:**

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

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#### **About Borealis and Borouge Automotive**

For over 50 years, Borealis has been a leading supplier of innovative polyolefin plastic materials for engineering applications in the automotive industry. Using its unique and proprietary Borstar® technology and its Fibremod™ post-reactor technology for fibre reinforced polypropylene (PP) compounds, Borealis delivers ideal replacement solutions for conventional materials such as metal, rubber and engineering polymers. Borealis continues to discover new material solutions which help facilitate lightweight construction and thus play an important role in enhancing energy efficiency. In automotive vehicles, Borealis' leading-edge polyolefin plastic materials are used in a wide range of exterior, interior, and under-the-bonnet applications, including bumpers, body panels, trims, dashboards, door claddings, climate control and cooling systems, air intake manifolds and battery cases.

#### **About Borealis and Borouge**

Borealis is a leading provider of innovative solutions in the fields of polyolefins, base chemicals and fertilizers. With headquarters in Vienna, Austria, Borealis currently employs around 6,500 and operates in over 120 countries. It generated EUR 8.3 billion in sales revenue in 2014. The International Petroleum Investment Company (IPIC) of Abu Dhabi owns 64% of the company, with the remaining 36% owned by OMV, an integrated, international oil and gas company. Borealis provides services and products to customers around the world in collaboration with Borouge, a joint venture with the Abu Dhabi National Oil Company (ADNOC).

Building on its proprietary Borstar® and Borlink™ technologies and 50 years of experience in polyolefins, Borealis and Borouge support key industries including infrastructure, automotive and advanced packaging.

The Borouge 3 plant expansion in Abu Dhabi will be fully operational in 2015. Borouge 3 will deliver an additional 2.5 million tonnes of capacity when fully ramped up, bringing the total Borouge capacity to 4.5 million tonnes. Borealis and Borouge will then have approximately 8 million tonnes of polyolefin capacity.

Borealis offers a wide range of base chemicals, including melamine, phenol, acetone, ethylene, propylene, butadiene and pygas, servicing a wide range of industries. Together with Borouge the two companies will produce approximately 6 million tonnes of Base Chemicals in 2015.

Borealis also creates real value for the agricultural industry with a large portfolio of fertilizers and technical nitrogen products. The company distributes approximately 5 million tonnes per year.

Borealis and Borouge aim to proactively benefit society by taking on real societal challenges and offering real solutions. Both companies are committed to the principles of Responsible Care®, an initiative to improve safety performance within the chemical industry, and contribute to solve the world's water and sanitation challenges through product innovation and their Water for the World™ programme.

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**For more information visit:**

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

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

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

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