



# MARKET

for composite solutions

SEPTEMBER 2014

# VISION



## Redefining Performance Through Product Leadership



**04** Redefined composites platform to meet global wind turbine industry needs



Courtesy of PTSA, Mexico

**06** Composites minimize corrosion, slash weight and cost.



Courtesy of Time Technoplast

**07** India gets its first Type IV LPG composite cylinder.

# EDITORIAL

## REDEFINING PERFORMANCE THROUGH PRODUCT LEADERSHIP



"Redefining Performance." This phrase is not just the theme of this issue of Market Vision, it's the driving ambition behind Owens Corning's Product Leadership agenda. But what exactly does this mean for you, our customers?

In short, it means opportunity. From a technical standpoint, we are creating new opportunities by leveraging our glass formulas, our sizings, and the interfaces between these two elements and the resins being reinforced.

To accomplish this ambition, we are aligning our resources to create and capitalize on opportunities. These resources include our global footprint, which encompasses 27 manufacturing facilities in 15 countries and six R&D centers on three continents. They also include expertise in product benchmarking; mastery of customer process replication; and mimicking, or using computer models to predict sooner than anyone else how a fiber will behave and how a composite will perform. The result is productivity and performance benefits for our customers.

We do not judge our success through our own eyes, but through those of our customers. For this reason, I am particularly pleased to share that we are seeing evidence of our growing technical expertise in the results of our bi-annual customer survey. The most recent edition of the survey revealed that customers believe our technical capabilities are advancing (this score has increased to 70 percent in Q1 from 62 percent last year) and represent an important element in our value proposition to them (88 percent of customers ranked technical expertise as "very important").

This is important because, at its core, Product Leadership is based on our customer's expectations in the areas of materials science, product performance, and product service and quality. Fittingly, we are redefining performance through the launch of new and differentiated product solutions developed in partnership with our customers. This year, Owens Corning will launch more than 10 new products providing productivity improvements and/or performance benefits.

This issue of Market Vision features several stories that illustrate this ambition in action.

For example, our "SMC Week" initiative with Novapol Plásticos Ltda. in Brazil (page 3) generated new ideas for advancing sheet molded compound (SMC) technical applications and market growth. As Novapol Vice President and General Manager Rodolfo Bayona said, "We benefited from Owens Corning's support to look for new ways to improve productivity and competitiveness along the entire value chain of our growing SMC business." This is precisely the type of collaboration we seek to achieve – meaningful customer collaboration that helps our customers win.

Our collaboration with India's Time Technoplast (page 6) provides another example of Product Leadership in action. Owens Corning's advanced fiber reinforced plastic (FRP) composite materials helped Time Technoplast design and manufacture India's first Type IV LPG composite cylinder.

Finally, the story of our redefined range of products for the global renewable energy marketplace (pages 4-5) describes a comprehensive program to expand productivity and performance benefits for manufacturers and operators of wind turbines. Earlier this year, Owens Corning launched a series of new products for the wind turbine industry including our new range of WindStrand® Type 30® rovings, and our next-generation Ultrablade® G3 unidirectional and new Ultrablade® Triax fabric solutions.

These are just a few of the many stories of customer-inspired product leadership that is redefining performance at Owens Corning.

We invite you to meet our team and see these and other product innovations up close at several upcoming industry events, including the China Composites Exposition in Shanghai (September 3-5) and the CAMX Composites and Advanced Materials Expo in Orlando, Florida (October 13-16).

Those of you who join us will find a team that loves challenges. Bring us yours and we will deliver on our commitment to redefine performance for you!

Sincerely,  
Arnald Genis  
Group President  
Owens Corning Composite Solutions Business

## 'SMC Week:' a unique win-win initiative to help customers succeed

Teams from Novapol and Owens Corning met for a week-long series of 360 degree presentations and discussions on the latest developments in sheet molding compounds (SMC), from material technology, applications and processing to business and markets.

Novapol Plásticos Ltda, located at Serra, Espírito Santo, Brazil, is part of the Chemicals division of the Orbis Group - a Colombia-based and leading Latin America manufacturer of polyester resins who has collaborated with Owens Corning for several decades. The event focused on tapping the vast potential of sheet molded compounds and subsequent composite applications in Latin America.

### SMC - a key strategic pillar for growth

Novapol has been developing its SMC manufacturing and technical capabilities as a key strategic pillar for further growth. The 'SMC Week' formula offered both teams,

**“a highly productive and energizing initiative to generate ideas that will contribute to our success. We benefited from Owens Corning's support to look for new ways to improve productivity and competitiveness along the entire value chain of our growing SMC business,”**

says Rodolfo Bayona,  
Vice President Chemical Business of Orbis.

\* Source: [www.almaco.org.br](http://www.almaco.org.br)

Contact: [MultiEndRovings@owenscorning.com](mailto:MultiEndRovings@owenscorning.com)

[www.grupo-orbis.com](http://www.grupo-orbis.com)



The exchange of ideas and technical product and manufacturing leadership will help bring new composite solutions to key market segments in Latin America particularly for automotive, building and construction - especially for modular structures - and sanitary applications.

### Construction market represents 50 percent of composites consumption in Brazil

According to figures from Maxiquim\*, a consulting firm reporting to the Latin American Composite Materials Association (ALMACO), the Brazilian composites sector reported a 9 percent increase in 2013 revenue when compared with the previous year - while production volume grew 1.7 percent reaching 210,000 tons. The construction sector led with 49 percent ahead of transportation (17), corrosion (11) and sewage treatment (6) for a total of 154Ktons. The remaining 56Ktons were consumed by wind power applications.





# Redefined composites platform to meet global wind turbine industry needs

The global renewable energy marketplace is healthy and growing and, according to a recent GWEC report<sup>1</sup> will be generating more than 25 percent of the world's electricity by 2035. Forecasts provided by MAKE Consulting, estimate that global generation capacity of electricity is expected to reach 6,300GW by 2020. According to the GWEC 2013 report, this will almost double to 10,500GW by 2030. A staggering quarter of this will be provided by wind power.

For nearly half a century wind turbines have scattered the horizon and in that time output has increased 18-fold from 450kW to up to 8MW. Wind blows freely around the world over land and sea, however harnessing it is not without technological challenges.

## Size matters - balancing fatigue-life and energy output

Modern turbine blades demand innovative design procedures and have sophisticated aerodynamic planes, the structure of which is supported by load-bearing spars. The entire blade is connected to the hub at the root area. Larger turbines help reduce the cost of energy (CoE) due to their lower installation costs. However this is driving demand for longer and lighter high-performance rotor blades capable of operating in extreme environments.

**“OEMs and owners of wind farms are looking for a balance between manufacturing costs and combatting fatigue-life consumption and overall operating costs to ultimately provide economic energy output,”**

says Dr. Christopher Skinner, Director of Product Platforms for Owens Corning's Composite Solutions Business.

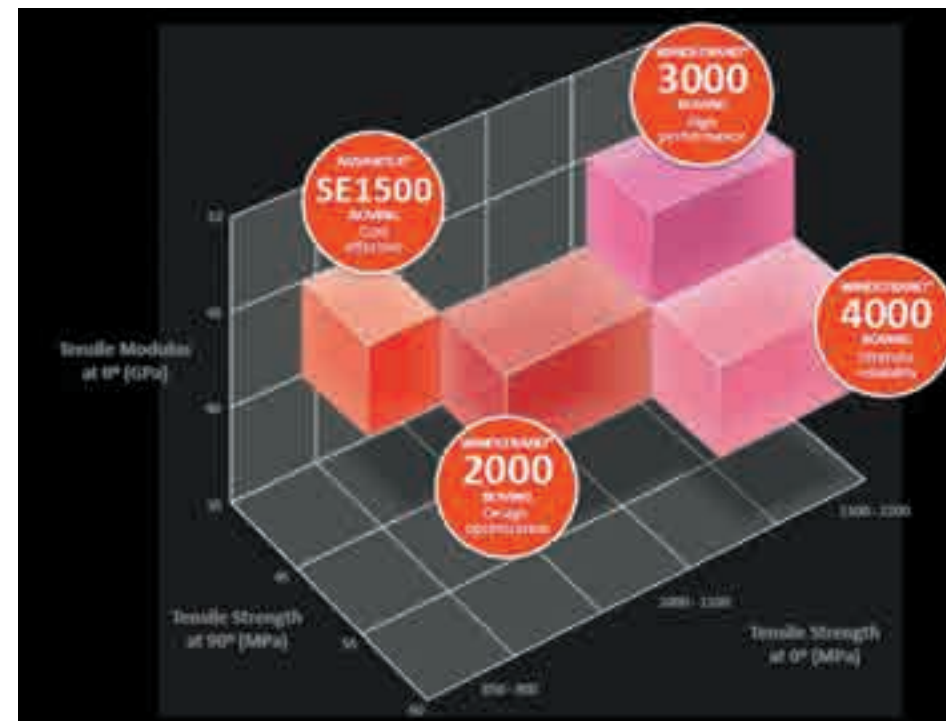
## Integrated E-CR glass-based fabric solutions for design optimization

To better deliver productivity and performance benefits to OEMs constructing and operating wind turbines, Owens Corning has redefined its range of WindStrand® Type 30® rovings which feature a powerful combination of optimized design, high performance, and ultimate reliability for longer blades in both onshore and offshore locations and in high- and low-wind areas. In combination with this redefined wind product platform is the company's next-generation Ultrablade® G3 unidirectional and new Ultrablade® Triax fabric solutions for specific wind turbine rotor blade applications. These integrated fiberglass solutions will help OEMs meet the reduction of the cost of energy (CoE) generated by both onshore and particularly the bigger offshore wind turbines in vast expanses up to 100km from the shoreline with some standing in depths of over 40 meters.

## Up to 20 percent longer blades with variable weight reduction

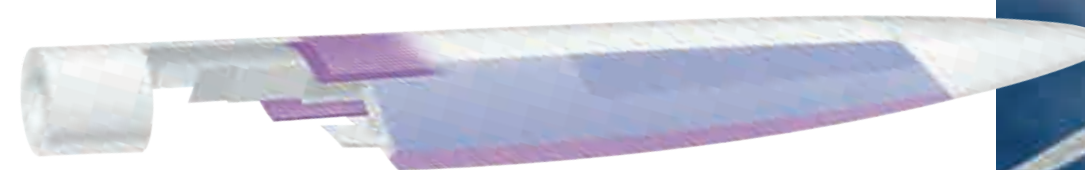
The new product range provides high weaving efficiencies for fabrics with optimized performance at 90 degrees

WindStrand® Roving Solutions : a powerful combination of optimized design performance, and ultimate reliability



(T). Each product is designed to perform at differing higher fiber volume fraction (FVF\*) levels. They help deliver lower resin consumption, contributing to an overall blade weight reduction of between 2 and 6 percent, depending on the specific application and roving utilized.

The new Ultrablade® G3 unidirectional (UD) fabric offers a high modulus and excellent 90-degree (T) performance, and up to 20 percent greater resistance to long-term fatigue loads. Its architecture can be customized to specific end-use applications to meet market requirements for longer blades both onshore and offshore, and in low-wind areas.



In UD spar cap applications, Ultrablade® G3 fabric displays excellent mechanical properties and it can also help reduce overall blade mass by up to 5 percent. Combined with an operating FVF level of more than 57 percent, this versatile UD fabric can help increase blade lengths by up to 20 percent for turbines operating in low-wind, onshore areas.

## Improved root joint designs provide 17 percent reduction of transferred loading to bolt

The patent-pending optimal construction of the new Ultrablade® Triax fabric enables improvement in root joint designs to reduce fatigue loads of T-Bolt flanging solutions. Enhanced blade root laminate stiffness and strength provides a reduction of up to 17 percent of the load transferred to rotor blade root bolts, thereby substantially improving bolt fatigue life.

Overall, the redefined E-CR glass-based fabric products from Owens Corning provide tailored and weight-saving solutions that are helping designers and engineers conceive blades that are lighter and longer. And they deliver improved aerodynamic performance with resistance to higher, long-term fatigue loads. Combined, these features enable the production of wind turbines that increase power yield and reduce the cost of energy (CoE) to help meet emerging industry needs.

Laminate properties Owens Corning internal tests 2014.  
1- Global Wind Report Annual Market Update 2013 (GWEC - Global Wind Energy Council)  
WindStrand®, Type 30® and Ultrablade® are registered trademarks of Owens Corning.  
\* FVF is the volume of fiber in a cured composite

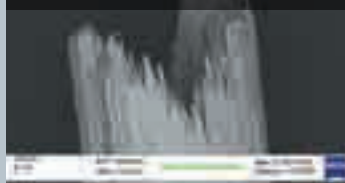
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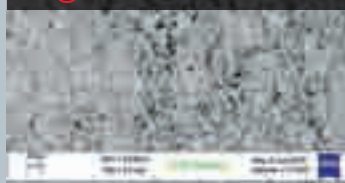
# Composites minimize corrosion, slash weight and cost

A study by Owens Corning revealed that carbon steel, stainless steel and conventional E-glass reinforcements showed severe corrosion damage after only four hours exposure to 5% hydrochloric acid. Whereas Advantex® E-CR glass offered exceptional corrosion resistance vs. metal alloys and E-glass, even at higher concentrations and for longer periods of time.

Carbon Steel in 5% HCl@96C after 4 hours



Stainless Steel - 304 in 5% HCl@96C after 4 hours



SS-316-L in 5% HCl@96C after 4 hours



E-Glass in 10% HCl@96C after 24 hours



Advantex® glass in 10% HCl@96C after 24 hours



Performance of CS, SS-304, SS-316-L, E-Glass, and Advantex® glass after exposure to hydrochloric acid. Source: Owens Corning Stress Corrosion Lab S&T Granville, 2013

Damage through corrosion costs industry trillions of dollars annually. The development of advanced fiberglass-reinforced plastics (FRP) offers an alternative which reliably extends the life of industrial applications in highly corrosive environments.

6-fold increase in the time to failure<sup>1</sup>.

In a comparative stress corrosion scenario an applied load of 100lbs (45,4kg), Advantex® E-CR glass composite showed a six-fold increase - equivalent to 17 years - in the time to failure compared with stainless steel.

**“FRP materials made with boron-free Advantex® E-CR glass can sustainably outperform more expensive stainless steel as well as high-cost metal alloys in acidic chemical environments,”**

says Matt Lieser, Owens Corning Specifications Manager. Choosing the right material for durability and cost-efficiency in aggressive industrial environments is essential.

Seven times lighter<sup>1</sup>, much lower fabrication and maintenance costs

FRP materials are up to seven times lighter than carbon steel. For typical stainless steel grades for tank liners, weight savings are considerably more with secondary cost savings for transportation, etc., and they also help eliminate the need for additional protective coatings, unlike metal alloys. Inherent design flexibility of composites allows innovative solutions for both small and large structures, including pipes, at much lower fabrication and maintenance costs - hardly possible in steel. Based on recent price bids (June-2014) obtained from USA steel and FRP tank manufacturers of chemical storage vessels of approximately 9,600 gallons (33,400 liters or 36m<sup>3</sup>) capacity, revealed that tanks fabricated using Advantex® E-CR glass was up to 15% less expensive than stainless steel (SS-304) counterparts. In addition, industry estimates indicate that up to 30% of the annual costs of all corrosion-related damage can be avoided when using Advantex® E-CR glass reinforced FRP materials for industrial applications.



<sup>1</sup> Case study of Owens Corning's Advantex® Glass Fibers versus stainless steel, April 2014

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# India gets its first Type IV LPG composite cylinder



© Pictures courtesy of Time Technoplast.

Composites continue to replace steel in novel applications such as Liquefied Petroleum Gas (LPG) cylinders offering a less arduous manufacturing process for lighter-weight, ergonomic and environmental benefits.

When India-based Time Technoplast, a leading manufacturer of innovative polymer packaging, acquired an established European manufacturer of LPG cylinders it decided to apply its polymer expertise to greatly improve the design and manufacture of existing steel cylinders which were laborious to make, prone to corrosion, unattractive and heavy to maneuver.

**Glass fiber composite keeps performing, even under pressure**

By employing Owens Corning's advanced fiber reinforced polymer (FRP) composite materials, Time Technoplast's initiative led to designing and manufacturing India's first Type IV composite LPG cylinder. Branded LiteSafe® in India, these new cylinders are composed of a seamless anti-permeation thermoplastic liner which is fully wrapped with epoxy resin impregnated Advantex® I58B glass fiber roving providing an unmatched combination of high tensile strength, lightweight and UV resistance to ensure optimum performance.

“The composite solution from Owens Corning contributes excellent processing ease during fabrication, outstanding mechanical properties and corrosion resistance that we require for this particular application,” stated Venkateshwaran N, Vice President Auto Components and Composites at Time Technoplast.

[www.timetechnoplast.com](http://www.timetechnoplast.com)  
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**“Importantly, the protective envelope made from Advantex® I58B glass fiber roving perfectly meets our requirement of passing all the burst and pressure tests and stringent regulatory fire standards needed for safe composite LPG cylinders,”** he added.

50 percent lighter than steel!

Ideal for both domestic indoor and outdoor usage, there are thousands of uses for LPG cylinders. The rust and corrosion proof LiteSafe® LPG cylinders from Technoplast are superior lightweight (ranging from 2.3kg/5lbs to 6.4kg/14lbs when empty) alternatives to traditional metal cylinders are the first of their kind in Asia. In addition to being fifty percent lighter than conventional steel cylinders, the composite solution is unique in that it is translucent and makes for easy visibility of propane gas levels which was previously impossible. They have an attractive and ergonomic outer casing - which can be custom colored and branded - made from high density polyethylene (HDPE) providing easy handling and additional further protection during transportation.

<sup>1</sup> Case Study of Owens Corning's Advantex® Glass Fibers in India's First Type-IV Composite LPG Cylinders Commercialized by Time Technoplast, April 2014

**Certified under international standards for safe use**

Prior to series production, the composite cylinders are repeatedly and exhaustively tested and have successfully obtained international standards such as ISO 11119-3, EN 12245:2002, EN14427:2004, EC/36/1999/TPED and ADR/RID certified by TÜV Rheinland, Germany. Additional approvals from Petroleum Explosives and Safety Organization (PESO) for the Indian market, Emirates Authority for Standardization & Metrology (ESMA) for the middle-East market, Liquefied Petroleum Gas Safety Association of South Africa (LPGSASA) signifies that Time Technoplast can now offer customers across India, the middle-East and north and south Africa safe, light, practical and easy-to-handle LPG cylinders.

LiteSafe is a registered trademark of Time Technoplast



# New App puts Technical Fabrics range at your fingertips

Specially developed to help designers, engineers and end-users fully discover the broad range of Owens Corning's fabric products to meet their particular application needs.

Already more than 80 featured products – new North America version available now!

The Technical Fabrics Guide, which was launched in March 2014, offers a comprehensive range of more than 80 products available to the European market highlighting benefits and resin compatibilities. A new version for North America is now available emphasizing U.S. product names and nomenclatures and imperial measurements

“*We designed the app so composites experts can find what they need, make a quick calculation and send a request to us in less than 5 minutes,*” said Marc Vautrin, Technical Fabrics Product Manager

Most advanced tool available featuring a material calculator

A material calculator enables you to estimate thickness for a laminate of a single product depending on the weight and fabric construction or, conversely, the glass content in a laminate to help identify the optimum solution for a given application.

You can also save results as «Favorites» for future reference or use them to send a request for additional information or further quotations.



## NEW APP PUTS TECHNICAL FABRICS AT YOUR FINGERTIPS

This new, free App tool includes a material calculator and can be downloaded now for Apple and Android devices. Have you got your version yet? Go to the App store or Google Play™ Store. Simply search «Tech Fabrics Guide» or «Composites Guide».



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Owens Corning, September 2014



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