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EDITORIAL

A HERITAGE OF INNOVATION



Today nearly 70% of all new product innovation is based on materials with new or improved properties¹

Through a spirit of innovation, Owens Corning was formed 75 years ago when Owens-Illinois and Corning Glass worked together to create a business focused on the production of fiberglass. The team creating Owens Corning understood the market would be looking for innovative materials to substitute for traditional materials – materials that would not only provide improved performance, but would also enable the development of new products and solutions. This vision led to the creation of an \$80⁴ billion global composite industry.

This innovative spirit has been challenged over the past four years as the global economy struggled, impacting key markets we serve. When I look at our composite macro environment today, it shows strong growth fundamentals and I believe the economy is accelerating, enabling an increase in composite application volume. Supply and demand are returning to a balanced state with rapidly increased capacity utilization throughout the industry. Now is the time to invest in innovation, ensuring we are prepared for future opportunities.

At Owens Corning, we have been and always will be, committed to innovation and value creation on behalf of our customers. We listen to our customers and work to deliver what is valued:

In 2007, the Worldwide R&D spending was \$ 1145 billion, i.e. 1.7% of the global GDP²

- Strong product performance and the introduction of relevant, new Best in Class products and solutions supported by world-class technical expertise – With six worldwide research and development centers located in key markets, Owens Corning is investing to ensure we deliver products and solutions focused on optimizing the role of composites in our customer's value chain. Through this focus, we work with our customers to deliver increased competitiveness through product redesign or productivity improvements. Owens Corning also offers one of the strongest technical team in the industry to understand our customer's businesses and to work with them on the development of new products, solutions and applications.
- Consistent product availability and fast, on-time delivery - We offer a manufacturing and distribution network that reflects our commitment to consistently provide quality products on the timing requested by our customers.
- An organization that responds quickly to changes in the market and our customers' businesses, providing relevant product and solutions – Because Owens Corning understands the business our customers are in, we can develop and deliver the right solution for current and future applications.

Global R&D spending is forecast to grow by 3.7% or \$53.7 billion to \$1.496 trillion in 2013³

Future Owens Corning innovation will look to composite technologies that provide corrosion-resistant solutions, structural composites resulting in light, efficient vehicles, and bio-based solutions driving sustainable buildings and providing products that enable lower energy. We also see a strong opportunity to improve overall composite processes resulting in improved consistency, quality and uptime for our customers.

Fostering an innovative spirit will continue to be a cornerstone of our industry leadership to meet the ongoing challenges we face as a global community and enable continued growth into even more demanding, innovative applications and technologies.

At Owens Corning, we are proud to celebrate our 75th year of delivering innovative solutions to our customers and we look forward to creatively meeting the challenges of our next 75 years!



OWENS CORNING | SINCE 1938

Sincerely,
Arnaud Genis
Group President
Owens Corning Composite Solutions Business

1 - Innovation Department of the European Commission, ec.europa.eu/index_en.htm

2 - Fondation Res-Publica, 2011, Pierre Papon

3 - Research by analysts at Battelle in Columbus, Ohio in its 2013 Global R&D Funding Forecast. R&D Magazine, Dec. 2012

4 - 60 billion euros Worldwide composite market, JEC group, 2011

Sharing Innovation Needs Leads to Joint Venture in Belarus

Owens Corning's unique relationship network encourages people connect together and the right partnerships happen to create new solutions.

The groundwork for one such collaboration was laid at an Owens Corning customer event in Paris during a JEC Composite Exhibition when two customers realized a common vision regarding composite pole development. That meeting led to a joint venture between composite manufacturers Galen (Russia) and Top Glass (Italy).

Top Glass and Galen began their collaboration in 2011 when Galen started manufacturing composite light poles using Top Glass technology. In 2012, the companies formally partnered in a joint enterprise named High Tech Profile. The new company recently opened in the Republic of Belarus and will produce standard composite and centrifugal casting poles.

said Galen's General Director Valery Nikolaev in an

“Our experience and manufacturing potential together with scientific and technical expertise give us the possibility to make products of high European quality.”

interview posted April 19, 2012, on NetComposites' Website. For over 10 years, Galen has specialized in manufacturing by pultrusion, a method used for producing profiles. “In this area, Top Glass has brought its technical, manufacturing, and commercial know-how specifically for expanding pole and pultruded profiles applications,” explained Alfonso Branca, Top Glass Managing Director. “Certainly both companies are interested in widening their product ranges and sales areas. The profile market is young but growing in Eastern Europe; and we plan to offer and make available quality products made in Russia,” concluded Nikolaev.

Light poles made of innovative composite material are



Courtesy Galen, Russia

a long-awaited alternative solution designed to replace concrete, galvanized steel, and wooden products. The composite light poles are very durable, highly corrosion resistant, and easily installed. “Compared to galvanized steel poles, composite poles are five times lighter. The weight of a standard 9-meter (29.5 ft.) composite pole is 42 kg, and it can be installed by only two workers,” asserted Galen's representative.

Both companies use Owens Corning glass roving made with Advantex® glass fiber, which combines the electrical and mechanical properties of traditional E-glass with the acid corrosion resistance of E-CR glass.

For more information, please visit <http://www.galen.su>; www.topglass.it; and <http://composites.owenscorning.com/aboutAdvantex>

Enhanced Production Efficiency in Spray-Up Applications

Released in September 2012, Owens Corning's OptiSpray™ Solutions are designed for spray-up processes in a variety of applications including swimming pools, spas, marine and transportation. These solutions are designed to provide optimal processing and performance for applications in a wide range of mold shapes and resin systems.

This family of products is made with Owens Corning's patented Advantex® glass fiber, which combines the electrical and mechanical properties of traditional E-glass with the corrosion resistance of EC-R glass.

According to Owens Corning Area Sales Manager Jay Persinger, Master Spas, Inc., one of the world's top spa and swim spa manufacturers, turned to Owens Corning for help in resolving a moisture "wicking" issue occurring during its fiberglass laminate process. "As it turned out, Owens Corning's glass fiber was the perfect solution," said Persinger. "Using Owens Corning glass resolved the issue

with "wicking" and was immediately incorporated into the laminate process," asserted Michael Rees, Master Spas Director of Manufacturing.

Master Spas began using the new OptiSpray™ F rovings in 2012 on a trial basis and is in the process of transitioning to using this product full-time. "We currently use Owens Corning glass in our first lamination process on our regular spas where complete wet out of the glass is fundamental," asserted Rees. "We also use Owens Corning glass in our entire Swim Spa lamination process, and we have seen spectacular results with the product," Rees continued.

"One of the biggest advantages of using the Owens Corning glass is its wet out capability. By using this glass, we have eliminated the wicking-type seeping that was an issue in the past", continued Rees.

“ Owens Corning glass is also softer and less abrasive, so our operators perform less blade change-outs with their guns. This saves approximately 30% on blade costs and helps with the productivity of the operator, Rees stated. ”

"We have evolved into a company that is known for its quality products, innovative features, extraordinary customer service, and industry-leading swim spa units, and using Owens Corning glass has played a big role in our success," concluded Rees.



**For more information, please visit
www.masterspas.com and <http://composites.owenscorning.com/optispray>**

Enhanced Spray-Up Applications Process

Owens Corning's OptiSpray™ roving solutions are available globally following their release in September 2012. This family of solutions includes OptiSpray™, OptiSpray™ H, and OptiSpray™ F rovings.

Made with Owens Corning's patented Advantex® glass fiber, which combines the electrical and mechanical properties of traditional E-glass with the corrosion resistance of E-CR glass, these solutions are designed to provide optimal processing and performance for spray-up applications in a wide range of mold shapes and resin systems.

According to Rich Fairfield, Owens Corning Area Sales Manager, customer evaluations indicate OptiSpray™ Solutions are already outperforming other available products. Operators at MTI Baths wholeheartedly agree, asserted Lee Locke, Production Manager of MTI Baths, an employee-owned company located in Sugar Hill, Georgia, that produces an expansive line of bath tubs/spa products. "The benefits of using OptiSpray™ rovings were immediately recognized. Our operators were impressed with the smooth chopping of the roving with no stoppages, optimal wetting, and easy rolling," asserted Locke.

"With uniform dispersion of the chop and smooth lay down, the overall surface quality is enhanced," stated Owens Corning Global Product Engineer Sanghamitra Sircar. "OptiSpray™ Solutions conform well to any curvature and have better air release thereby allowing customers to realize faster rolling," Sircar continued.

"Using OptiSpray™ roving has definitely improved productivity," stated Locke

“ Our rolling time was reduced from 10 min. to 8 min. per part, which has allowed us to increase our production. This translates into a huge savings, ”

continued Locke.

MTI Baths' founder, JC Henry, was an engineer-turned entrepreneur who started the company in 1988. With his incredible vision of innovation, he was determined to make the best whirlpool tubs on the market, and his legacy includes the world's first self-cleaning whirlpool – the Fill-Flush® whirlpool system.

"MTI is proud of its reputation for impeccable quality, innovation, unique product customizations, and commitment to the environment and is happy to include Owens Corning's OptiSpray™ roving as an integral part of its processes as it looks to a future unwavering in its commitment to the spirit of innovation," concluded Locke.



For more information, please visit www.mtibaths.com and <http://composites.owenscorning.com/optispray.aspx>

Reinforcement Solutions for the Gypsum Industry



In today's residential and commercial building industry, there are numerous applications where glass reinforcement is replacing paper in gypsum wallboard, including exterior sheathing, interior wet rooms, fireboards, and standard and high-strength impact boards.

Owens Corning has developed a glass fiber veil that is a specialty-coated, non-woven fiberglass material with a mineral-filled coating representing a new generation of facing material to replace paper on gypsum board.

Owens Corning reinforcements play a key role in enhancing the mechanical performance of gypsum



boards when used to modify the core or the surface of the panels. "Our expertise in pioneering glass fiber and coating development enables leading solutions in every product form including wet-use chopped strands, rovings, and non-woven veils," stated Etienne Chevallier, Owens Corning Residential and Commercial Building Regional Leader EMEA, Russia and Latin America. "Our specialty glass-based, non-woven solutions help enhance the durability of the final panels creating opportunities for value-added gypsum products with mold and mildew resistance, water repellency, UV resistance, and strength and integrity," added Chevallier.

Gypsum wallboard and sheathing products use glass fiber reinforcements to provide dimensional stability. OptiFlow® fibers are expressly formed to reduce clumps and assist in improving production rates using a technology that helps manage fiber forming, moisture, and fuzz. All Owens Corning products including OptiFlow® are made with its proprietary Advantex® glass. And, the boron- and fluorine-free Advantex® corrosion resistant E-CR glass has a higher softening point (916°C) than standard E glass materials (850-870°C).

stated Owens Corning Market Development Manager Michael Kuhn. "The company business model is grounded in servicing individual customer

“Almost all non-woven products manufactured by Owens Corning are unique for each customer and application, ”

needs. Its global manufacturing platform ensures delivery of consistent solutions in all regions and supports our continuous presence and dialogue by all industry stakeholders," Kuhn added.

Join us to discuss potential application developments at the TechTextil 2013 show in Frankfurt, Germany, on June 11-13.

The OptiFlow® reinforcement is specifically designed to provide major benefits through a dry feed process.

- **+ 28%** machine direction flexural strength
- **+ 13%** shear strength for better resistance to stress or load*
- Low (less than 0.1 %) surface cracking under fire load*
- Improved stiffness for lightweight board
- Consistent glass feeding during processing

* Values as compared to non-reinforced wallboard.
(Owens Corning external consultant data, 2012)

For more information, please visit <http://www.nonwoventechnologies.com> or contact nonwovensinfo@owenscorning.com

Glass-Based Solutions Enhance Cured-in-Place Pipe Relining

With the rising demand to maintain and improve underground infrastructures around the world, a growing trend is emerging in the use of trenchless technologies. And, cured-in-place pipe (CIPP) technology provides trenchless rehabilitation methods to repair pipelines that are leaking or structurally unsound.

Sustainable market trends need expert solutions

In 2011, Owens Corning launched Ultrapipe[®] fabric, a product range dedicated to serve the global glass-based CIPP industry. "CIPP is a jointless, seamless, pipe-within-a-pipe solution with the capability of rehabilitating sewer pipes ranging in diameter from 0.1 to 2.8 meters (4 in.–110 in.)," stated Kees den Besten, Program Manager for CIPP at Owens Corning. "Ultrapipe[®] fabrics are combined with several types of resins to make glass-based CIPP liners enabling the trenchless rehabilitation of a wide variety of sewer pipes," continued den Besten.

In the last decade, the European CIPP industry especially (about 1/3 of the global market) has recognized the benefits of

glass-based, UV curable liner solutions over traditional hot curable felt liners. Today, about 50% of the liners installed in Europe (~ 1500 km) are based on glass.

The glass fabric liners are typically installed through a manhole or other existing access point, making the technique especially attractive in crowded areas.

“Ease of installation, efficiency, rapid availability, and minimal disruption to the surrounding infrastructure are driving the growth of this technology,” said den Besten.

Since this method requires little to no digging, it is more commuter friendly than traditional "dig and replace" pipe repair methods. Calculations show that CIPP technology uses about 10% of the CO₂ of conventional "dig and replace" methods. "And, CIPP projects can be completed much faster than traditional open-cut techniques. In many cases, a CIPP renovation job can be completed within one day while dig solutions require weeks," added den Besten.

Source: Presentation of Prof. Jens Hölterhoff (Chairman of the German Society for Trenchless Technology) during the German Schlauchlinertag on 21.04.2009 in Pforzheim, Germany.

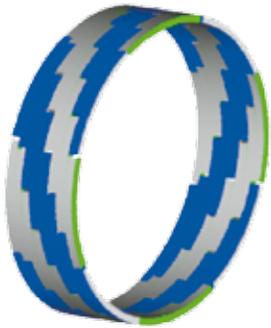
Glass-Based Solutions Enhance Cured-in-Place Pipe Relining

(Contd)



Courtesy Reline Europe, Germany

Working side-by-side with customers to develop fundamental product and process innovation



Schematic picture of LOC-technology providing fiber orientation and stretch-ability

Today all Ultrapipe® fabric solutions are based on Advantex® E-CR glass, a glass type that combines excellent corrosion properties with a long life-time. "Our Ultrapipe® fabric solutions are clearly recognized in the new glass-based CIPP market today," asserted Jan Coerts, Owens Corning Global Business Manager. "In recent years, Owens Corning has launched several new products for its CIPP customers. Our extra translucent glass helps to extend the diameter range

for glass-based UV lining solutions. With this glass, thicker laminates can be cured without the need for a double curing system (UV + organic peroxides). This improves the shelf life and reduces the risk of losing a liner due to premature cure," concluded Coerts.

Owens Corning has extended its application lab with the capabilities to replicate all customer liner processes like impregnation, curing, and installation. This further supports its customers and stimulates continuous product development.

Owens Corning also has developed and installed additional innovative fabric production technology that will allow a broader CIPP product portfolio based on its patented LOC (long-oriented chop) technology. "This technology positions the fibers during fabric production to achieve an optimal balance between fibers oriented in the longitudinal – to endure pull-in forces during installation – and hoop directions of the pipe – to maximize pipe stiffness," said den Besten. "This technology also provides fabric stretch-ability to allow a close fit in the existing host pipe," den Besten added.

Latest developments focus on improved liner performance related to high pressure water cleaning resistance. "All of our solutions are finding their way to the market via the Ultrapipe® brand. Owens Corning is ready to support the growth of glass-based CIPP solutions," concluded den Besten.

For more about Ultrapipe® fabric solutions, contact us at <http://www.ocvtechnicalfabrics.com/> or technicalfabrics@owenscorning.com



INNOVATIONS FOR LIVING™

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