



2015 North American Hybrid Long Glass+Carbon Fiber Composites
New Product Innovation Award



FROST & SULLIVAN



50 Years of Growth, Innovation & Leadership

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Background and Company Performance

Industry Challenges

Long fiber reinforced thermoplastic composites hold a smaller share in the overall composites market that aims to provide structural performance demanded by metal replacement applications. This can be primarily attributed to the fact that short fiber compounds offer ease-of-processing at reduced cost, while continuous fiber composites offer superior structural properties they are more difficult to fabricate with. Long fiber composites require unique processing, as it is sometimes difficult to obtain consistency in fiber length, which significantly impacts product quality and performance. Thermoplastic-based long fiber composites are more prevalent, due to their high volume processing via injection molding and the increased performance that they offer in comparison to the corresponding short fiber compounds. Frost & Sullivan points out that companies are therefore striving to develop cost-competitive and high-performance products to cater to the dynamic needs of their industry.

Frost & Sullivan research confirms that long glass fiber composites have experienced rapid adoption within the thermoplastic composites market, whereas carbon fiber composites that offer superior weight reduction advantages have demonstrated limited penetration in the automotive industry (because of their higher cost). Automotive original equipment manufacturers (OEMs) report to Frost & Sullivan how they are compelled to reduce the overall weight of the vehicle due to the growing stringency in regulations. The US EPA (Environmental Protection Agency) and NHTSA (National Highway Traffic Safety Administration) have stipulated the latest standards to reduce greenhouse gas emissions and improve fuel economy for model years 2017 through 2025. This has resulted in an increased focus towards weight reduction among automotive OEMs, to which performance, reliability, and robust design and aesthetics remain paramount. Frost & Sullivan also points out that one of the key challenges in the industry is to develop a material that offers an optimum balance between price, performance, and aesthetics.

In addition, automotive OEMs that offer extended warranties to customers are increasingly persuading material manufacturers to develop products that offer improved durability and long life cycle performance. It is vital that composite material formulations and processing are carefully controlled to allow OEM customers to develop durable components for vehicles. As a result, composite manufacturers need to liaise with injection molding processors, component manufacturers, and OEMs to understand their product requirements. Additional value creation through continuous support of material and process optimisation is also becoming increasingly important in the marketplace. It is critical for composite manufacturers to develop specialization expertise and offering customized products. Companies, in turn, require a well-established product portfolio that hosts a number of grades of products to enlarge their portfolio of customized materials, thereby helping companies gain a foothold in the marketplace.

New Product Attributes and Customer Impact

Match to Needs

PlastiComp, a manufacturer of long fiber reinforced thermoplastic composite technologies, has been operating in the North American long fiber composites market since 2003. In its pursuit to offer enhanced customer satisfaction and redefine the marketplace, Frost & Sullivan appreciates the fact that PlastiComp has been leveraging its in-depth industry knowledge and investing heavily in research and development (R&D) initiatives to augment its technological capabilities. This has led to the introduction of a diverse range of advanced technologies, such as custom engineered long-fiber reinforced thermoplastic (LFT) composite pellets. In the current economic perspective, there has been an increasing need for carbon fiber composites (unlike only glass fiber composites) to reduce weight and control exorbitant costs. Composites hold a strong position, as they provide enhanced performance in any number of unique applications through improving either structural, functional, or aesthetic properties. PlastiComp - identifying this recent need for cutting down on the costs and reducing weight - has begun blending - long carbon and glass fiber composites and consequently create a trend that will revolutionize the traditional industry landscape. This imperative need is aptly in line with the recent developments in the Corporate Average Fuel Economy (CAFÉ) standard prevalent in the automotive industry, which compels OEMs to make vehicles much lighter, safer, cleaner, and more cost effective than ever before.

Reliability

The company is constantly focusing on developing a superior product that meet and exceed customer expectations.

Technologically sturdy, the company has managed to spread its products globally by the effective development of varied technologies. The company has maintained perfect parity between the functional performance of its products and the customer service it offers by continuously introducing products with enhanced value proposition.

Positioning

Frost & Sullivan also notes that the current North American long fiber composites market is experiencing a surge in customer demands, owing to the emerging need for both reducing weight and improving performance. To achieve this dual purpose, long fiber technology and allied products are being increasingly developed by companies. This has resulted in a strong positioning for PlastiComp's Complēt Hybrid long glass and carbon fiber reinforced composites ahead of the competition, denoting the company's rich expertise in the North American market.

In a short span of time, PlastiComp has been able to drive excellence through its long fiber composites to compete against the highly commoditized short fiber compounds market. PlastiComp has pioneered the development of hybrid fiber product by blending the carbon and the glass fibers into a single composite pellet using a special pultrusion

compounding method. This method assists in deriving a homogeneous injection-molded material apt for the diverse industry applications that require long fiber composites. Such a homogenous product does not impede the performance quotient and, at the same time, offers a cost-effective alternative to clients (by giving them access to the high-performance capabilities of carbon fiber). The company has also adopted an optimum mix of proactive and reactive product development strategies that ensure an extensive product portfolio, allowing customers to choose the best-fit material for their needs. At the same time, PlastiComp has developed strong expertise in quickly developing highly customized products that resolve key customer challenges. Frost & Sullivan feels that the company has therefore been able to position itself quite well in the marketplace as a fully-integrated one-stop solution provider.

Design

Integrating glass and carbon fibers in the right proportion for an effective long fiber composite output is PlastiComp's key focus. The mixing ratios can be tailored as per the different specifications of varied customers with regards to cost and performance. When compared to conventional thermoplastic materials, the end output has a similar life cycle, but there exists additional advantages when the material needs to be either recycled or re-grounded. The material can be reused in other high-performance applications. Additionally, the processability is more seamless than thermoset materials, as it is injection molded with short production cycle times

Customer Ownership Experience

PlastiComp has been consistently responding to key customer requirements in the marketplace resulting in impressive confidence for the company. Moreover, it fosters a culture of innovation and excellence to address the emerging industry requirements by leveraging its strong acumen to gauge market trends and effectively address them. For instance, customers often remain skeptical about the fatigue and creep resistance properties of discontinuous fiber reinforced composites. Through PlastiComp's expertise, unidirectional continuous fiber inserts were developed to be molded with the long fiber thermoplastic compounds. As a result, the material's load to fatigue life of one million cycles was increased from 50% to 70% of the strength of the material. This is a classic example of the company's ability to meet and exceed customer expectation by offering highly customized products.

A cohesive bond with the customers further solidifies the company's position, with the company addressing their unique needs in a customized manner. For instance, long fiber reinforced composites allow high levels of customization in terms of obtaining complex shapes, while at the same time utilizing less material. This has been made possible through a high fiber loading to offer improved performance and has proven to add increased value to customers -- not only in terms of performance, but also optimized resources. With a short lead time and high success rate, PlastiComp clearly stands out as a company with differentiated abilities that is capable of offering customers an enriched ownership experience. The company is focused on delivering products with superior cost advantages, design freedom functionality, and performance. With its added offer of mold

flow, finite element analysis services, and a designated team of specialized engineers, the company serves as an end-to-end service provider.

PlastiComp also participates in trade shows as a further effort to retain customers and to make its client base aware of the unique attributes of its products. The company is also a key member of the Institute for Advanced Composites Manufacturing Innovation consortia in Knoxville, Tennessee. This is an initiative from President Obama to advance the use of composites in transportation. PlastiComp is one among the 122 companies partnering in the institute that focus on next generation composite materials.

Customer Service Experience

Technical competence has been the key to the company's success in the long fiber composites market. Through this, the company has established an extensive product portfolio consisting of a wide range of material grades for applications. This offers a clear competitive edge that meets and exceeds customer requirements in a quick and timely manner. The company is able to offer the best-fit material for customers after extensively and exhaustively evaluating the wide range of materials available in its portfolio. For instance, while offering customized products to meet specific performance requirements, fiber content is the most frequently modified element in the material formulation. However, PlastiComp, through its sophisticated technical capability, conducts testing and analysis on a number of key parameters such as molding process, fiber chemistry, orientation, length, and morphology in order to deduce the most favorable material design that meets customer requirements. In addition to this, the products are designed to allow a high degree of customization, which further helps reduce turn-around time when delivering products. Engineering material solutions using long fiber technology to meet specific need makes PlastiComp one of its kind in the North American industry. By maintaining strong rapport with its customers, PlastiComp provides them with the competence to carry out their own processing.

Conclusion

Identifying the current market need for reinforced long fiber technology and materials, PlastiComp has ideally utilized its rich industry experience and innovative skills set to develop highly differentiated and quality assured hybrid fiber composites. Its dedication to drive excellence in terms of customer value enhancement and pertinent product delivery has positioned it far ahead of the rest of the competition. In all, its comprehensive approach to designing a custom product and offering analysis assistance at every step helps the company fortify its relationship with customers, thus enhancing its brand image.

With its strong overall performance, PlastiComp has earned the 2015 Frost & Sullivan New Product Innovation Award for its Hybrid Long Glass+Carbon Fiber Composites.

Significance of New Product Innovation

Ultimately, growth in any organization depends upon continually introducing new products to the market, and successfully commercializing those products. For these dual goals to occur, a company must be best-in-class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding New Product Innovation

Innovation is about finding a productive outlet for creativity — for consistently translating ideas into high quality products that have a profound impact on the customer.

Key Benchmarking Criteria

For the New Product Innovation Award, Frost & Sullivan analysts independently evaluated two key factors— New Product Attributes and Customer Impact—according to the criteria identified below.

New Product Attributes

- Criterion 1: Match to Needs
- Criterion 2: Reliability
- Criterion 3: Quality
- Criterion 4: Positioning
- Criterion 5: Design

Customer Impact

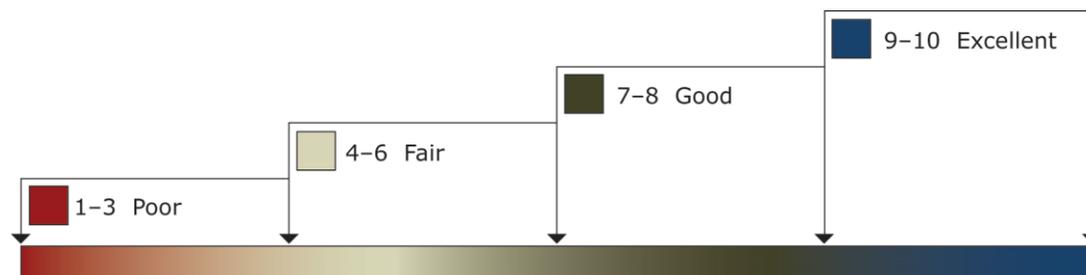
- Criterion 1: Price/Performance Value
- Criterion 2: Customer Purchase Experience
- Criterion 3: Customer Ownership Experience
- Criterion 4: Customer Service Experience
- Criterion 5: Brand Equity

Best Practice Award Analysis for PlastiComp, Inc.

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyze performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are illustrated below.

RATINGS GUIDELINES



The Decision Support Scorecard is organized by New Product Attributes and Customer Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criteria are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key players as Competitor 2 and Competitor 3.

DECISION SUPPORT SCORECARD FOR NEW PRODUCT INNOVATION AWARD

<i>Measurement of 1-10 (1 = poor; 10 = excellent)</i>			
New Product Innovation	New Product Attributes	Customer Impact	Average Rating
PlastiComp, Inc.	9.4	9.2	9.3
Competitor 2	8.7	8.4	8.6
Competitor 3	8.1	8.3	8.2

New Product Attributes

Criterion 1: Match to Needs

Requirement: Customer needs directly influence and inspire the product’s design and positioning

Criterion 2: Reliability

Requirement: The product consistently meets or exceeds customer expectations for consistent performance during its entire life cycle

Criterion 3: Quality

Requirement: Product offers best-in-class quality, with a full complement of features and functionality

Criterion 4: Positioning

Requirement: The product serves a unique, unmet need that competitors cannot easily replicate

Criterion 5: Design

Requirement: The product features an innovative design, enhancing both visual appeal and ease of use

Customer Impact

Criterion 1: Price/Performance Value

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market

Criterion 2: Customer Purchase Experience

Requirement: Customers feel like they are buying the most optimal solution that addresses both their unique needs and their unique constraints

Criterion 3: Customer Ownership Experience

Requirement: Customers are proud to own the company’s product or service, and have a positive experience throughout the life of the product or service

Criterion 4: Customer Service Experience

Requirement: Customer service is accessible, fast, stress-free, and of high quality

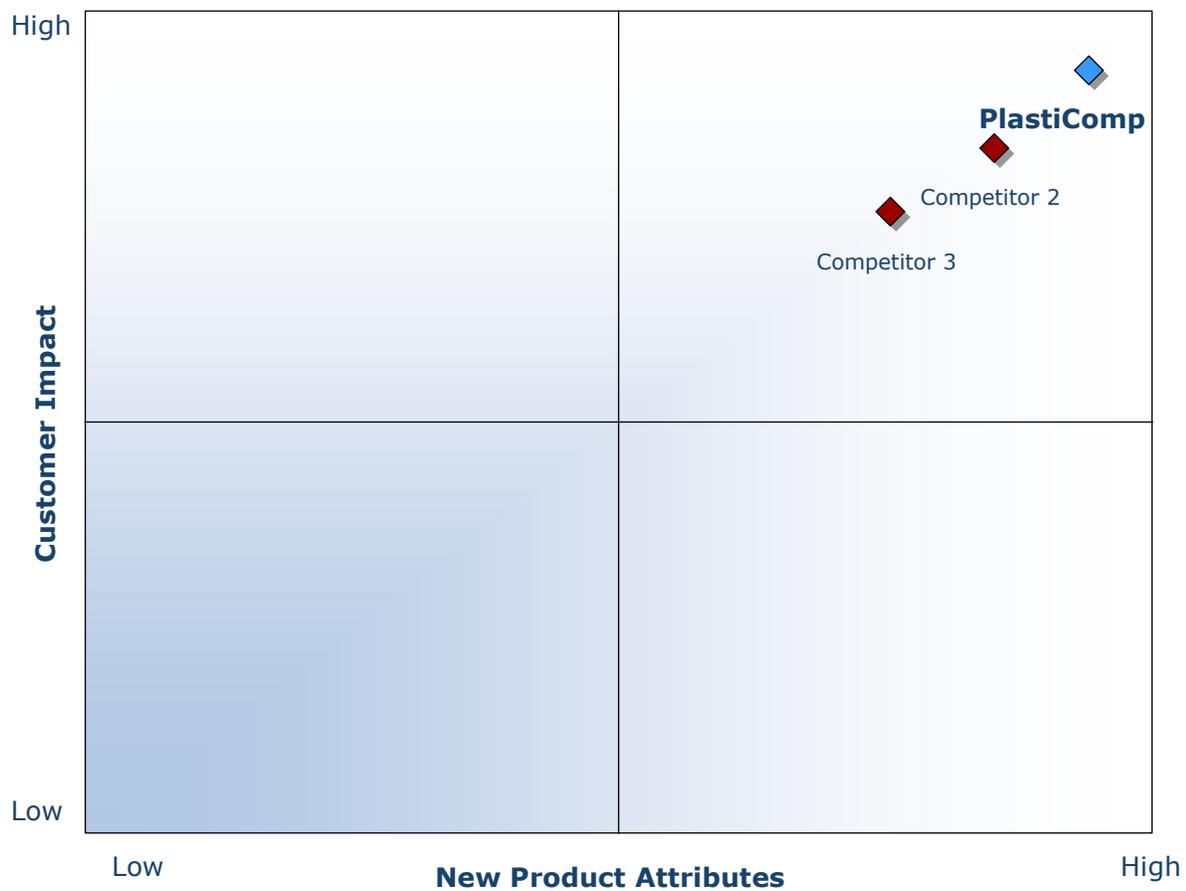
Criterion 5: Brand Equity

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts can then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.

DECISION SUPPORT MATRIX FOR NEW PRODUCT INNOVATION AWARD



The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan Awards follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 Monitor, target, and screen	Identify Award recipient candidates from around the globe	<ul style="list-style-type: none"> • Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies 	Pipeline of candidates who potentially meet all best-practice criteria
2 Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> • Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates 	Matrix positioning all candidates' performance relative to one another
3 Invite thought leadership in best practices	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> • Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps 	Detailed profiles of all ranked candidates
4 Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> • Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles 	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> • Share findings • Strengthen cases for candidate eligibility • Prioritize candidates 	Refined list of prioritized Award candidates
6 Conduct global industry review	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> • Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates 	Final list of eligible Award candidates, representing success stories worldwide
7 Perform quality check	Develop official Award consideration materials	<ul style="list-style-type: none"> • Perform final performance benchmarking activities • Write nominations • Perform quality review 	High-quality, accurate, and creative presentation of nominees' successes
8 Reconnect with panel of industry experts	Finalize the selection of the best-practice Award recipient	<ul style="list-style-type: none"> • Review analysis with panel • Build consensus • Select winner 	Decision on which company performs best against all best-practice criteria
9 Communicate recognition	Inform Award recipient of Award recognition	<ul style="list-style-type: none"> • Present Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance 	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 Take strategic action	Upon licensing, company may share Award news with stakeholders and customers	<ul style="list-style-type: none"> • Coordinate media outreach • Design a marketing plan • Assess Award's role in future strategic planning 	Widespread awareness of recipient's Award status among investors, media personnel, and employees

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best in class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages almost 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 31 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.