

CARBON-FIBER COMPOSITES

2026 Composite Industry Insights

PERFORMANCE

INTERFACES

INDUSTRIALIZATION

What will define tomorrow's composite performance?

Perspectives from the composites community collected during National Composites Week.

We Asked The Composites Community

Carbon-fiber composites are being asked to do more.

More performance. More consistency. Less weight. Faster production. Better economics.

Carbon-fiber composites continue to enable lighter, higher-performing structures across increasingly demanding applications. But advancing composite technology is about more than improving a single mechanical property.

Performance must increasingly coexist with manufacturing consistency, cost, weight, durability, sustainability, and the requirements of complex multi-material structures.

During National Composites Week, L&L Products invited the composites community to share its perspective on the challenges facing the industry today and the opportunities that could shape its future. Through our detailed industry survey and complementary social polls, we collected more than 60 survey responses and poll interactions.

We asked about material performance. Manufacturing. Interfaces. Joining. Innovation priorities.

AUG 24 - SEP 4

2026 survey period

65+

survey responses & social poll interactions

4 CHANNELS

Website / LinkedIn / Instagram / Facebook

6+ TOPICS

performance | interfaces | manufacturing |
joining | innovation | future priorities

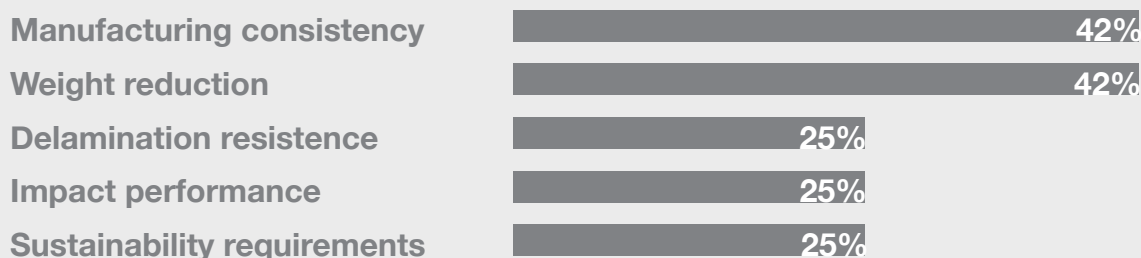
One question at the center of it all.

What will define tomorrow's composite performance?

Performance is only part of the equation.



58% **cost performance balance** was the most frequently identified current challenge in the detailed survey.



The responses suggest that advancing carbon-fiber composites is as much an industrialization challenge as a material-performance challenge. A composite can deliver exceptional mechanical performance, but broader adoption depends on whether that performance can be delivered consistently, efficiently, and at an acceptable system cost.

Cost-performance balance was not the only pressure identified. Manufacturing consistency and weight reduction each appeared in 42% of detailed survey responses, while delamination resistance, impact performance and sustainability requirements each appeared in 25%. The result suggests that composite development is being judged at material, process and system level at the same time.

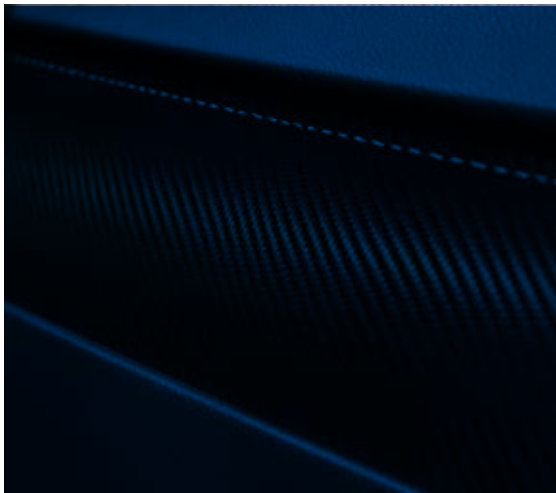


VOICE OF THE INDUSTRY

“The price for carbon fiber manufacturing has to be decreased and made more sustainable.”

KEY INSIGHT

The challenge is not simply achieving higher performance. It is turning higher performance into solutions that can be manufactured, scaled, and economically justified.



But when we asked about the laminate, the priorities shifted.

67% would significantly improve interlaminar performance



When respondents moved from broad industry constraints to laminate behavior, interlaminar performance rose to the top.

Half of detailed survey respondents also selected toughness, while compression-after-impact performance and durability were each selected by 42%. Energy absorption followed at 33%. Rather than indicating one universally preferred property, the distribution shows several related performance concerns around how laminates manage loading, damage and continued service.

That shift matters. It suggests that the engineering conversation changes when attention moves from the complete business and manufacturing system to the way the laminate itself behaves.

Toughness is not just one number.

DAMAGE TOLERANCE

IMPACT PERFORMANCE

INTERLAMINAR PERFORMANCE

COMPRESSION-AFTER-IMPACT

ENERGY ABSORPTION

DURABILITY

44% selected damage tolerance as the biggest carbon-fiber performance challenge in complementary social polling.

These characteristics describe different aspects of composite behavior and should not be treated as interchangeable. Compression-after-impact, for example, is a residual-strength measure after an impact event, whereas damage tolerance is a broader structural concept. The survey does not collapse these into a single toughness metric. Their repeated appearance is used here as a directional indication that damage-related laminate behavior matters to respondents.

Together, the responses point toward a broader engineering question:

How does a laminate behave when damage occurs?

Between the layers is where opportunity emerges.



75% identified interlaminar materials and interfaces as an opportunity for innovation.

67% would improve interlaminar performance.

Interlaminar behavior appeared independently in two parts of the research: first as a desired performance improvement, then as an opportunity for innovation.

This cross-question consistency is one of the more notable observations in the detailed survey. It does not establish causality or a universal industry ranking, but it provides a coherent signal that the interfaces between plies warrant closer examination alongside resin chemistry, fiber selection and manufacturing process development.

The interlaminar region deserves attention.



But material performance cannot be solved in isolation.

58% identified **manufacturing processes** as an opportunity for innovation

The next generation of composite technology must perform in the laminate and work on the manufacturing floor.

Recurring industrialization themes

- Manufacturing consistency and repeatability
- Cost-effective production and scale
- Automation and faster production
- Long-term durability and repair
- Recyclability and sustainability
- Application-specific qualification requirements



VOICE OF THE INDUSTRY

“Consistent, cost-effective manufacturing of multi-material composite structures while maintaining reliable interfaces and long-term durability.”

Whatever innovation happens at material level must ultimately translate into a reliable, repeatable part.

The open responses reinforce this point. Participants raised cost-effective manufacturing, automation, long-term durability, recyclability and scale. One respondent specifically linked carbon-fiber manufacturing cost and sustainability to the feasibility of broader high-volume applications such as automotive.

The laminate does not exist in isolation.

As composites become part of more complex multi-material systems, respondents pointed beyond laminate performance to joining, service life, compatibility and repair.



Reliable interfaces matter both within the laminate and where the composite meets the wider structure.

Website responses included composite-to-metal joining, composite-to-plastic joining, polymer-to-polymer joining, joint durability and aging, and repair and maintenance. Because participation in the complementary social joining poll was limited, these observations are presented as themes rather than ranked priorities.





So what did the industry tell us?

1

Performance and economics must move together.

Cost-performance balance led current challenges.

2

Interlaminar performance deserves attention.

67% would improve it.

3

Interfaces represent an innovation opportunity.

75% selected interlaminar materials and interfaces.

4

Damage-related performance takes many forms.

Damage tolerance, impact, CAI, energy absorption, durability and toughness all appeared.

5

Better materials still have to make better parts.

Manufacturing, cost, consistency and production speed remain central.

What if we could change the behavior between the layers?

Without redesigning the entire composite system?

The findings do not point to a single solution. They do, however, identify the interlaminar region as an area where performance improvement and innovation opportunity intersect.

That distinction is important. The research also identifies manufacturing, cost, weight, joining and sustainability as meaningful constraints. The interlaminar signal should therefore be interpreted as one technically relevant opportunity within a broader composite-system challenge, not as a conclusion that one material approach can address every priority.

BEYOND LIMITS

T-Link®

Innovative composite performance
solution built on the T-Link® Platform.

Introducing Toughened T-Link® L-F620

One observation from the research stands out: interlaminar performance was identified both as a property respondents would improve and as an area for future innovation.

This is also an area L&L Products has been investigating.

Toughened T-Link® L-F620 is a targeted interlaminar material designed to be incorporated within a carbon-fiber composite laminate. Rather than changing the entire fiber or bulk resin system, the approach focuses material functionality at selected interfaces.

The engineering objective is to explore whether targeted interlaminar toughening can contribute to more damage-tolerant composite structures while remaining compatible with the surrounding laminate and manufacturing process.

The survey findings provide context for why this area deserves investigation; they are not evidence of L-F620 performance. Product claims should be supported only by validated laminate-level test data, with control configuration, processing conditions, test method, sample size and variability reported alongside the results.

One Industry Challenge. Once Targeted Material Response.

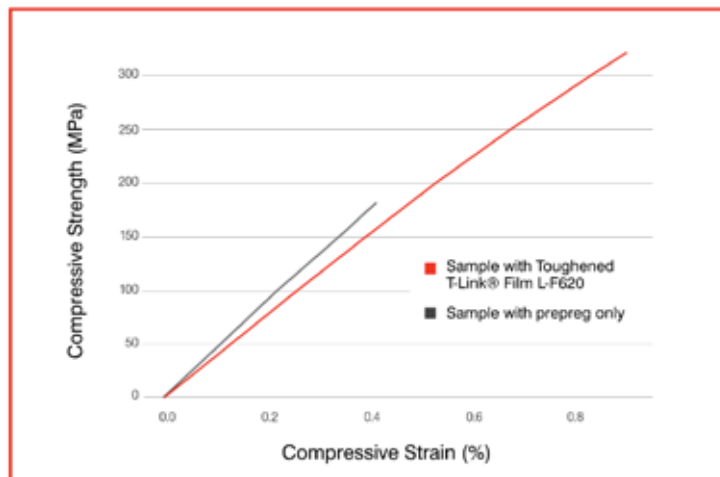
The Data

The survey highlighted interlaminar performance, damage tolerance and interfaces as recurring areas of interest. Toughened T-Link® L-F620 is designed to address these challenges through targeted interlaminar toughening of epoxy carbon-fiber composites.

Testing across several laminate configurations provides evidence of how L-F620 can influence damage propagation, residual performance and laminate toughness.

66% Higher compression strength after impact

In NIAR testing according to ASTM D7137, laminates incorporating Toughened T-Link® L-F620 demonstrated a 66% increase in compression strength after impact compared with the prepreg-only configuration under the evaluated conditions.



~5x Higher mode in fracture toughness

In ASTM D5528-13 testing conducted at NIAR, adding a 1 mil L-F620 interleaf increased initiation G1c from 303 to 1,433 J/m² and propagation G1c from 284 to 1,499 J/m² compared with prepreg alone.

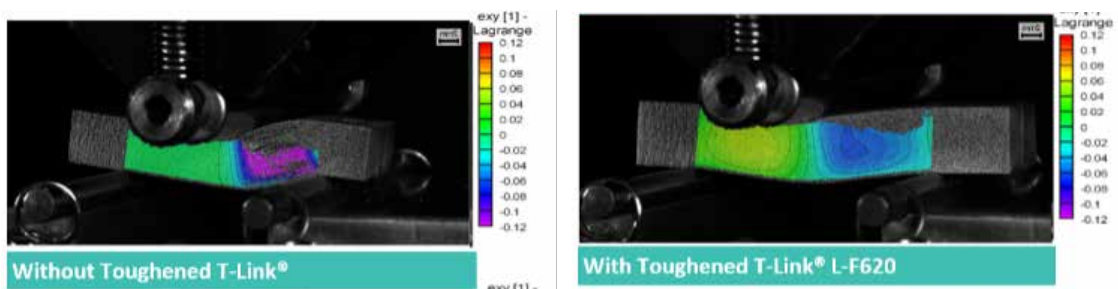
NIAR Test Results	Prepreg Only	Prepreg + L-F620
Initiation G1c (NL) [J/m2]	303	1433
Std. Dev. [J/m2]	303	278
Propagation G1c (NL) [J/m2]	284	1499
Std. Dev. [J/m2]	11	794

~70% Smaller observed damage area

Representative NIAR impact results at the 1500 and 1700 in-lbf/in impact levels showed approximately 69% and 70% smaller damage areas, respectively, for the L-F620 configurations compared with prepreg-only specimens.

Fatigue performance maintained under tested conditions

Three-point bend fatigue testing showed the Toughened T-Link® L-F620-interleaved laminate tracking the reference fatigue behavior across the evaluated range, with no loss in fatigue performance reported under the tested conditions.



The Engineering Takeaway

Across the evaluated configurations, Toughened T-Link® L-F620 demonstrated a combination of higher resistance to delamination, reduced impact damage and greater compression strength after impact, while maintaining fatigue performance under the tested conditions.

Together, these results support a more complete approach to composite toughening: Tougher. More damage tolerant. Engineered between the layers.

**Results are specific to the materials, laminate constructions, Toughened T-Link® L-F620 configurations, processing parameters and test conditions evaluated. Representative specimen results should not be interpreted as group-average performance. Test values are not product specifications. Customers should validate Toughened T-Link® L-F620 within their own material systems and manufacturing processes.*

Tomorrow's composite performance will not be defined by one property.

PERFORMANCE.
MANUFACTURABILITY.
COST.
WEIGHT.
DURABILITY.
SCALE.

The conversations started during National Composites Week show how interconnected these priorities have become.

Toughened T-Link® L-F620 represents one approach to one part of that challenge: the interlaminar region.

How to interpret the findings

The 2026 Carbon-Fiber Composites Industry Survey was conducted by L&L Products in connection with National Composites Week. The in-depth survey was hosted on the L&L Products website and received 12 completed responses. Shorter polls published through L&L Products' social-media profiles generated a further 58 votes: 35 on LinkedIn, 20 on Instagram and three on Facebook. Participation was generated organically, without paid promotion.

The website survey was also shared through CompositesWorld, potentially extending its reach beyond L&L Products' direct audience. However, because referral sources were not tracked at the respondent level, individual website responses cannot be attributed to a particular channel. Across all channels, the initiative generated 70 recorded survey responses and poll votes.

Because participation was voluntary and self-selected—and because the website survey and social-media polls used different questions, formats and audience sizes—the results are presented separately rather than combined into a single data set. The findings should be interpreted as directional rather than statistically representative of the carbon-fiber composites industry as a whole. Nevertheless, they provide a useful snapshot of current industry perspectives and priorities and highlight emerging themes that merit further discussion.

LET'S KEEP THE CONVERSATION GOING.

 **L&L Products®**