

SMARTER MATERIALS™

Unlock Modular Construction Potential
with Flame Retardant (FR) Composite Panels





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SMARTER MATERIALS

FR Composite Panels

Time to Reconstruct

Construction's future lies in building faster – at scale – while building smarter. How can we make that claim? Look no further than the rise in modular, prefab, and off-site techniques. These industry newcomers represent a decisive response to rising costs, regulatory pressures, and global demand for more housing.

When it comes to modular/prefab/offsite building, time is money, and efficiency is critical. We believe materials can make the difference between a project that simply meets its goals and one that surpasses them.

But every builder knows there's more to this story. The challenges are steep: traditional materials often weigh down progress, literally and figuratively. Wood, gypsum, and steel have long been the mainstays, perceived as the familiar and cost-effective choices.

Yet, as safety codes grow stricter and construction projects become more modular, these materials start to show their limits. They require multiple layers for fire resistance, contributing to higher costs, added labor, and longer project timelines. They aren't easily recyclable, adding to construction waste at a time when every industry is under scrutiny to reduce its environmental footprint.

“ Innovative design approaches like modular construction and prefabrication can significantly reduce on-site labor costs and project timelines. ”

~ Atul Khanzode, Chief Technology and Innovation Officer,
DPR Construction as quoted in Construction Digital magazine,
October 2024





The good news: we've developed advanced composite panels for walls, ceilings, floors, and more, designed specifically for these pressures. They're adaptable, efficient, and cost-effective, and they could redefine the way you think about modular construction. In the pages ahead, we'll explore the needs of today's builders and why our composite panels can change the game for builders like you.

WHAT'S THE DIFFERENCE?

Modular Construction: A building process where sections (modules) are prefabricated in a factory and then transported to the construction site for assembly.

Panelized Systems: Construction methods involving prefabricated panels—such as walls, floors, and roofs—that are assembled on-site.

SIPs (Structural Insulated Panels): High-performance building panels used in floors, walls, and roofs, consisting of an insulating foam core sandwiched between two structural facings.

Off-Site Construction: The process of planning, designing, fabricating, and assembling building elements at a location other than the final building site.

Prefab (Prefabricated): Components or entire structures manufactured in a factory setting before being transported and assembled on-site.

Source: [PROBUILDER magazine](#)



Weighty Challenges

Of course, the adoption of modular and off-site construction methods comes with its share of struggles. You're grappling with significant obstacles while trying to meet cost, regulatory compliance, efficiency, and scalability targets. These difficulties underscore the limitations of traditional materials and the need for innovative solutions that align with modern construction needs.



COST CONSTRAINTS

Traditional interior wall materials—wood, gypsum, and steel—are familiar. They are perceived as the most economical choice. Plus, their availability and long history in the industry make them comfortable options for builders.

However, the seeming affordability of these materials can be misleading. While newer, more advanced materials may come with higher upfront costs, the long-term savings—reduced labor requirements, lower transportation expenses, minimized assembly needs, and increased assembly safety—often make them the more cost-effective choice over a project's lifecycle.

Bottom line: Evaluating alternative materials requires a clear understanding of how they can deliver lasting value beyond the initial price tag



FIRE SAFETY AND COMPLIANCE

As fire safety regulations continue to evolve and halogens are phased out, you're under increasing pressure to find materials that meet stringent standards without adding excessive complexity or cost. Traditional materials often require multiple fireproofing layers to comply with codes like ASTM E84 or NFPA 286, which increase project costs and complicate installation.



CONSTRUCTION EFFICIENCY

Efficiency is a fundamental concern in most industries, and modular construction is no exception. Traditional materials can complicate this process, as they are often heavy and require extensive handling, slowing down assembly times. Streamlined materials that simplify handling and eliminate process steps are essential for improving on-site efficiency and meeting tight project deadlines.

Evaluating new materials? Take time to see the long-term value, not just the sticker price.



ISSUES FACING THE MODULAR CONSTRUCTION INDUSTRY

- Cost Efficiency
- Quality/Durability
- Construction Speed
- Sustainability
- Labor Cost
- Scalability
- Structural Performance



SCALABILITY

Modular construction allows for the efficient scaling of projects, accommodating both small and large developments with consistent quality and speed. Keep in mind, though, that scaling up to larger, more complex developments introduces additional logistical and regulatory challenges. Transporting large modules over long distances can be costly and complicated, particularly in areas with restrictive local building codes or challenging site conditions. Moreover, the high costs associated with transporting heavy traditional materials can make scaling up less attractive.

For example, transporting oversized prefab units from the manufacturing facility to the construction site may cross several state lines. This requires compliance with varying transportation regulations, permits for oversized loads, and coordination with local authorities to navigate through congested urban areas. Additionally, the sheer weight of units constructed with traditional materials like steel and gypsum adds significant transportation cost and requires specialized equipment, leading to delays.

Speaking of weight, heavier units can require reinforced cranes, which in turn slow down the assembly process and increase labor costs.

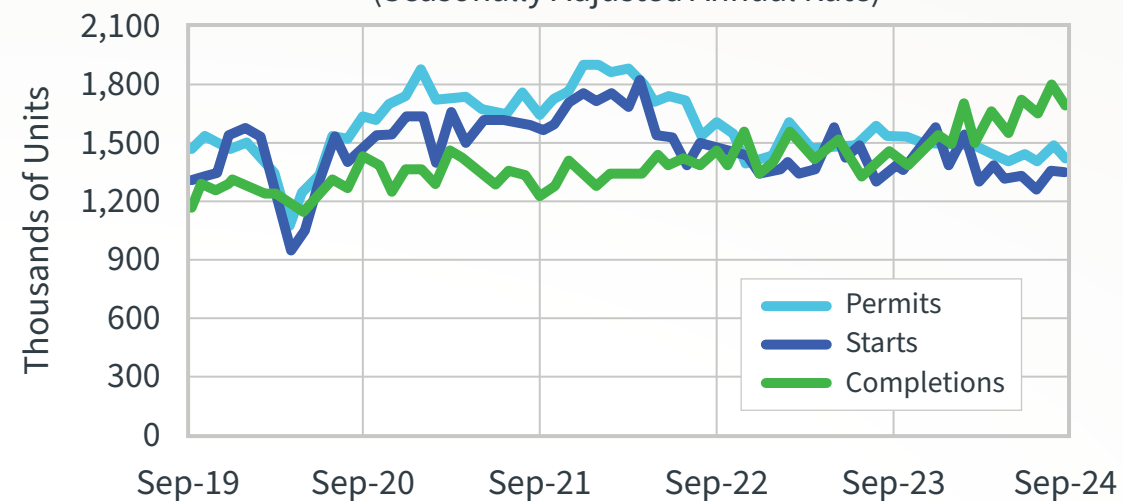


Market Overview & Trends

Industry hurdles aside, housing construction, in general, clearly stands at a pivot point today. While residential housing completions are trending up, permits and starts are down, according to the latest US Census Bureau data. Multi-family new construction starts are down roughly 30% YOY, while single-family starts are down over 3% in the same period.

New Residential Construction

(Seasonally Adjusted Annual Rate)



Source: U.S. Census Bureau, HUD, October 18, 2024





Factors affecting these data points include labor shortages, rising demand for housing, mortgage interest rates, and a heightened emphasis on sustainability.

One of the major factors propelling the industry toward modular construction is its **ability to reduce costs and meet tight project timelines**. According to a McKinsey & Company report, modular projects:

- have established a solid track record of **accelerating project timelines by 20 to 50%**
- can deliver **over 20% in construction cost savings** when optimized for scale

In a survey conducted by Prefab Modular Smart Market Report (2020):

- **91%** of contractors reported improved budget performance when using modular techniques
- **68%** of these indicated **savings of 5% or higher**
- respondents indicated **reductions in project durations of 20 to 50%**

Another factor—the well-publicized shortage of available and affordable housing stock—is also contributing to the rise of modular construction, particularly in urban areas with high demand and limited space.

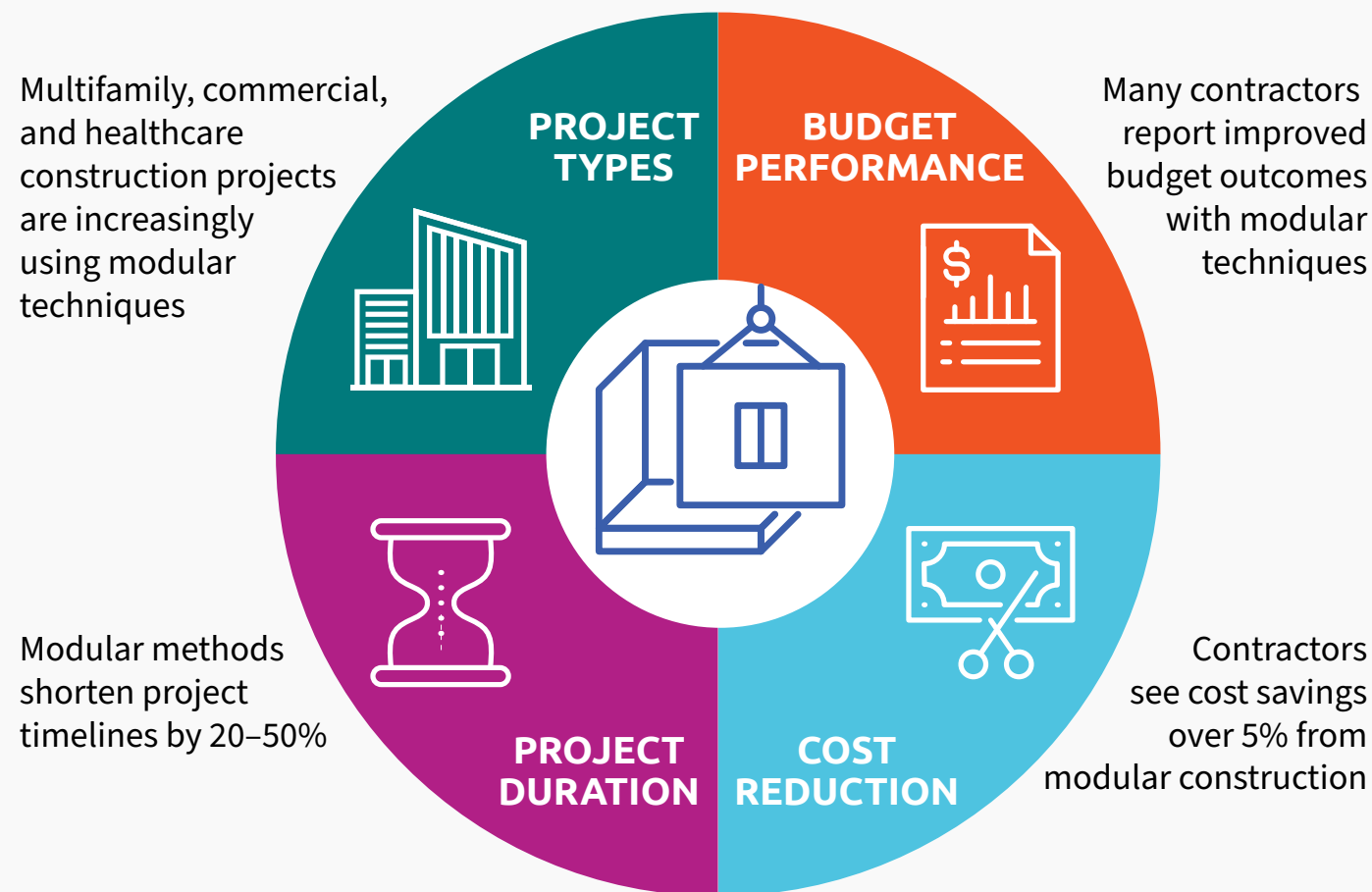
Prefabrication not only supports rapid construction. It also enables greater quality consistency because weather is no longer a factor and the manufacturing environment is controlled.



Again, the adoption of modular construction is not without its trials. The logistical hurdles of transporting heavy, prefabricated sections across long distances and navigating varying regional regulations continue to complicate its widespread use.

Builders must also grapple with a lack of familiarity with modular techniques and insufficient local prefabrication facilities, which hinder broader adoption. Transportation costs can escalate quickly, especially when dealing with oversized sections, making scalability a persistent challenge for larger projects.

Benefits of Modular Construction





Gamechanger

Modular and off-site construction projects demand materials that do more: streamline projects without sacrificing performance. We designed our new Hammerhead™ FR flame retardant composite panels to meet these needs head-on, offering a smarter alternative to gypsum, wood, and steel.

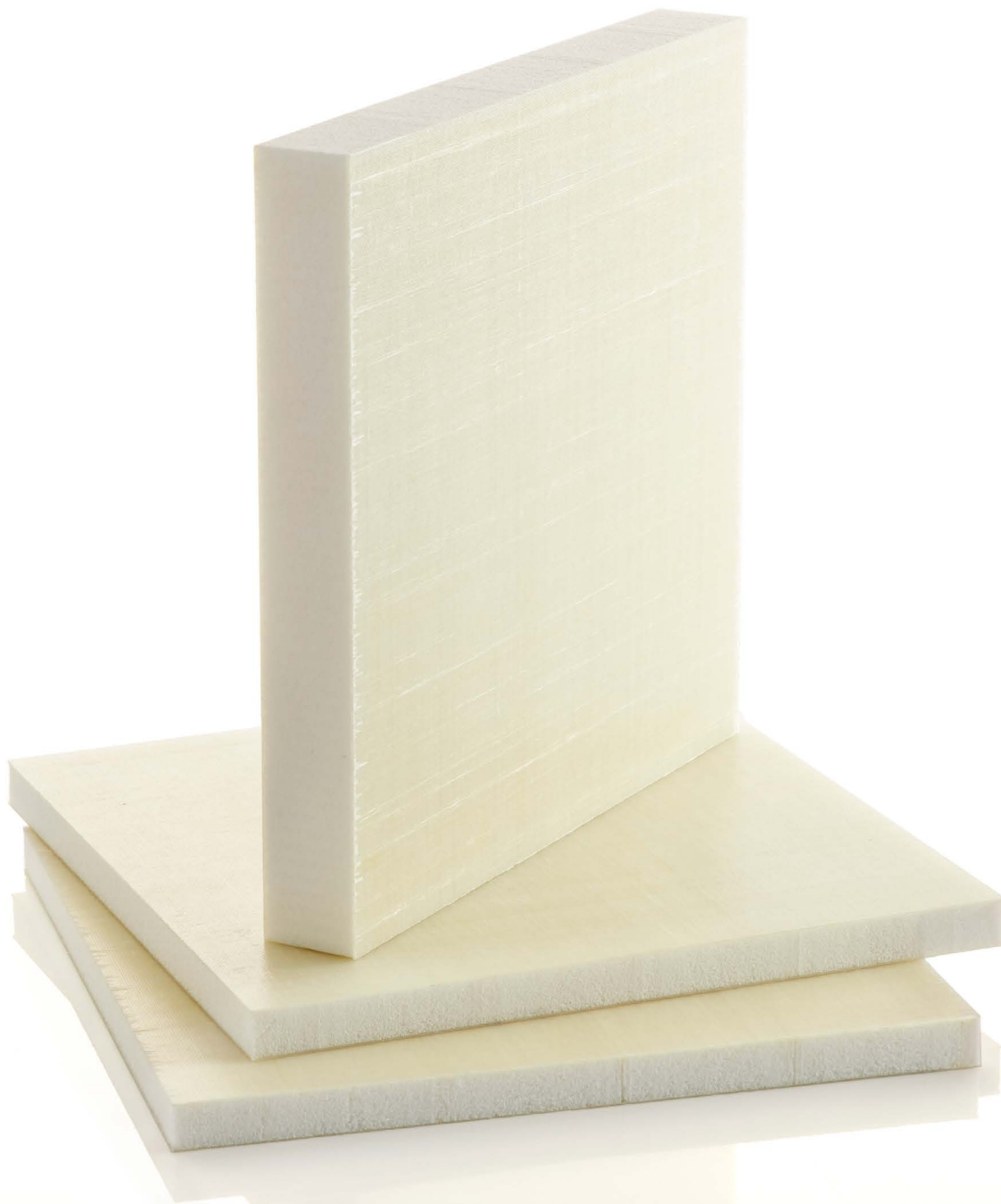
Why Choose Thermoplastic Composite Panels?

Traditional materials have their place but often fall short when projects require speed, efficiency, and compliance with modern safety codes. Our non-halogenated, flame-retardant panels bridge these gaps, enabling builders to move beyond the limitations of outdated solutions.

Integrated, non-halogenated FR: Engineered to meet fire retardance standards without the need for additional fireproofing layers. This means fewer materials, faster installation, and reduced labor costs.

- Eliminates the need for additional sheets or coatings to achieve specific FR performance
- Reduction of labor costs and assembly time as paintable panels come ready to install
- No need to stop other construction projects while assembling FR panels (most coatings require a delay until they dry and cure before construction can resume)





Lightweight/Durable: By replacing heavy materials with these panels, builders can reduce structural weight without compromising integrity. This translates to simpler transportation, easier handling, safer assembly, and cost savings at every step.

- Weigh less than wood, drywall, OSB, or gypsum wall assemblies
- Lighter weight makes them easier to transport
- Strong structural integrity even when exposed to flame and other elements

Versatile/Ready to Install: Available in wide-format panels, they ship ready to install and are suitable for a range of applications, from interior walls to ceilings and floors. In addition, the panels feature easily paintable surfaces and strong adhesive bonding properties. They can also integrate aesthetic surface finishes to eliminate the need for wallpaper and/or paint.

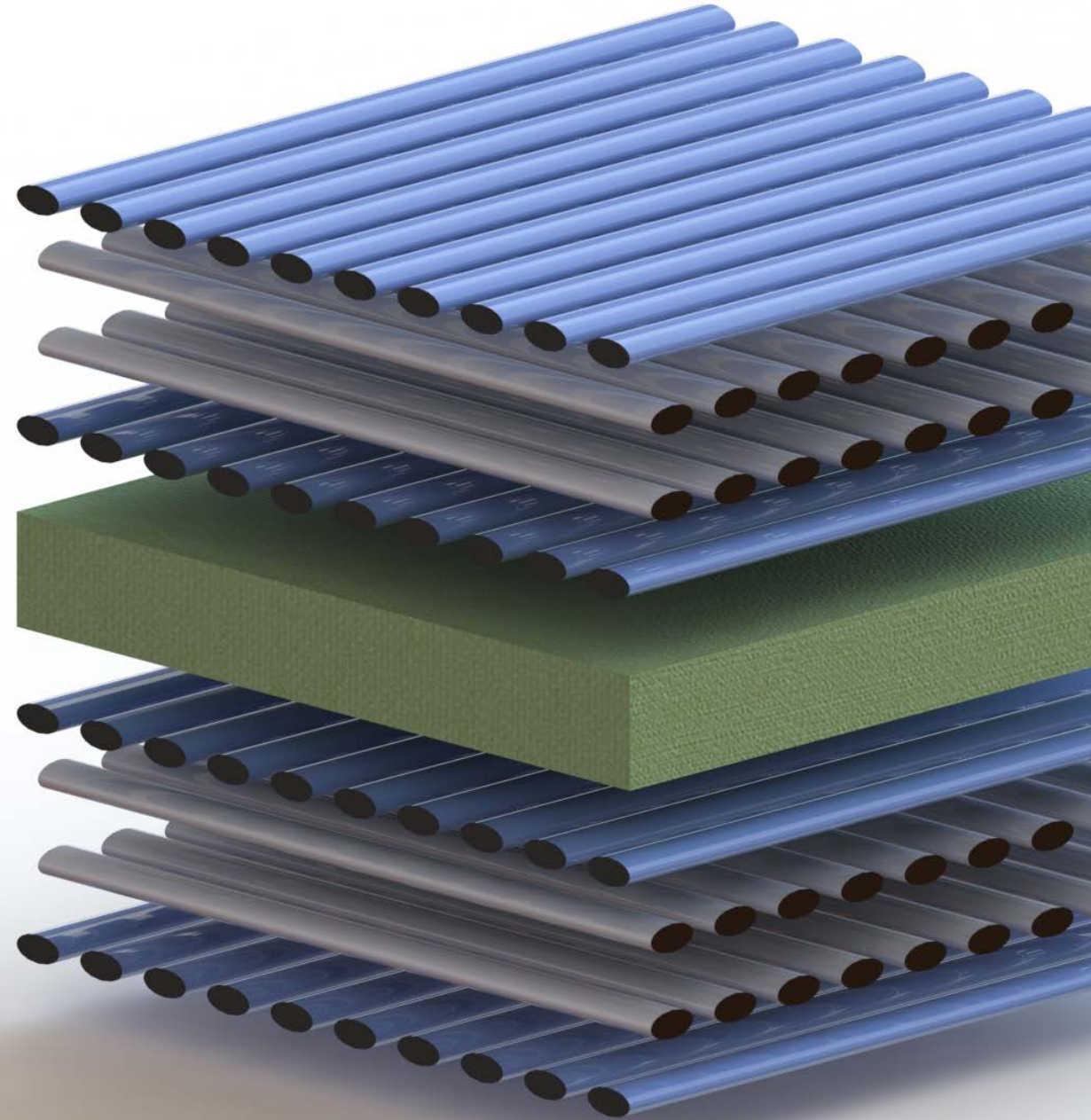
We designed our panels to enable smarter, faster, and more efficient construction practices. Builders can meet tight deadlines and strict safety codes without being held back by the weight or complexity of traditional materials. With Hammerhead FR thermoplastic composite panels, efficiency moves from aspirational to achievable.



What's the Difference?

Our Hammerhead FR composite panels consist of specially formulated continuous fiber reinforced thermoplastic (CFRTP) sheets bonded to a thermoplastic foam core. How do they stack up to traditional panel materials?

- **Lighter-weight panels:** this can result in roughly 20% higher productivity (11.8 sq. ft./person-hour on average compared to 9.7 sq. ft./person-hour for plywood).
- **Able to be recycled:** used panels can be shredded to produce new reinforced plastic parts using thermoplastic processes like injection molding, extrusion, and thermoforming.
- **Higher impact resistance:** a prototype home constructed with thermoplastic composite panels passed Florida hurricane wind standards of 140 mi/hr.
- **Consistent pricing:** Raw materials for the FR composite panel (core, laminate, FR components, etc.) are readily available and are rather stable in terms of price. Traditional material prices have been volatile post-pandemic, rising from 8 to 77%.





Solving for X

Modular construction presents several puzzles: How do you lower costs without cutting corners? How do you stay compliant with increasingly strict fire codes while keeping projects on schedule? And how do you meet demand without adding complexity? These aren't small challenges, but the right materials can help tip the scales in your favor.

We kept these exact pain points in mind when designing Hammerhead FR panels. Here's how they measure up.

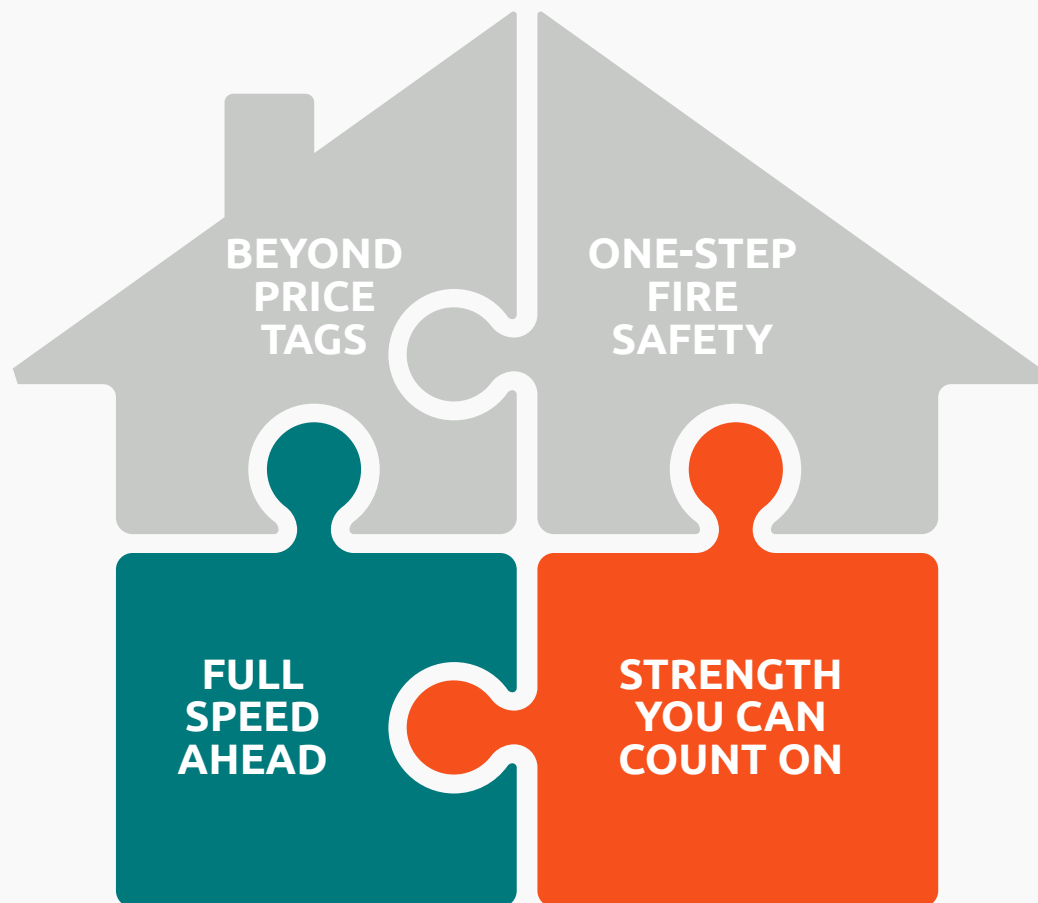
Every project brings its own unique complications, but these panels can make those problems easier to tackle.



- **Beyond Price Tags:** Materials are just one piece of the cost puzzle. Installation, transportation, and maintenance can quickly add up, especially when working with heavy or layered materials like steel or gypsum. Avient's panels simplify the process by combining fire resistance, durability, and light weight into a single solution. The result? Fewer materials to handle, less time spent on-site, and long-term savings that go straight to the bottom line.
- **One-Step Fire Safety:** Every builder has faced the headache of adding extra coatings or layers to meet fire codes. It's time-consuming and eats into your budget. These panels come ready to meet various building standards for flame retardance¹ right out of the gate. That means fewer steps in your process and one less thing to worry about.



¹ Test reports available upon request



- **Full Speed Ahead:** In modular construction, every saved hour counts. These large-format panels—up to 12 feet wide and lengths 24 feet and beyond—are built for efficiency. They're easy to handle, simple to integrate with other materials, and quick to install. That's less time on-site and more progress per hour.
- **Strength You Can Count On:** Durable doesn't have to mean heavy. These panels can withstand moisture, chemicals, and other tough conditions while remaining significantly lighter than wood, gypsum, or steel. And with their lighter weight, they help cut down on transportation costs, too. Whether you're building walls, floors, or something entirely unique, their versatility offers multiple ways to fit the job.



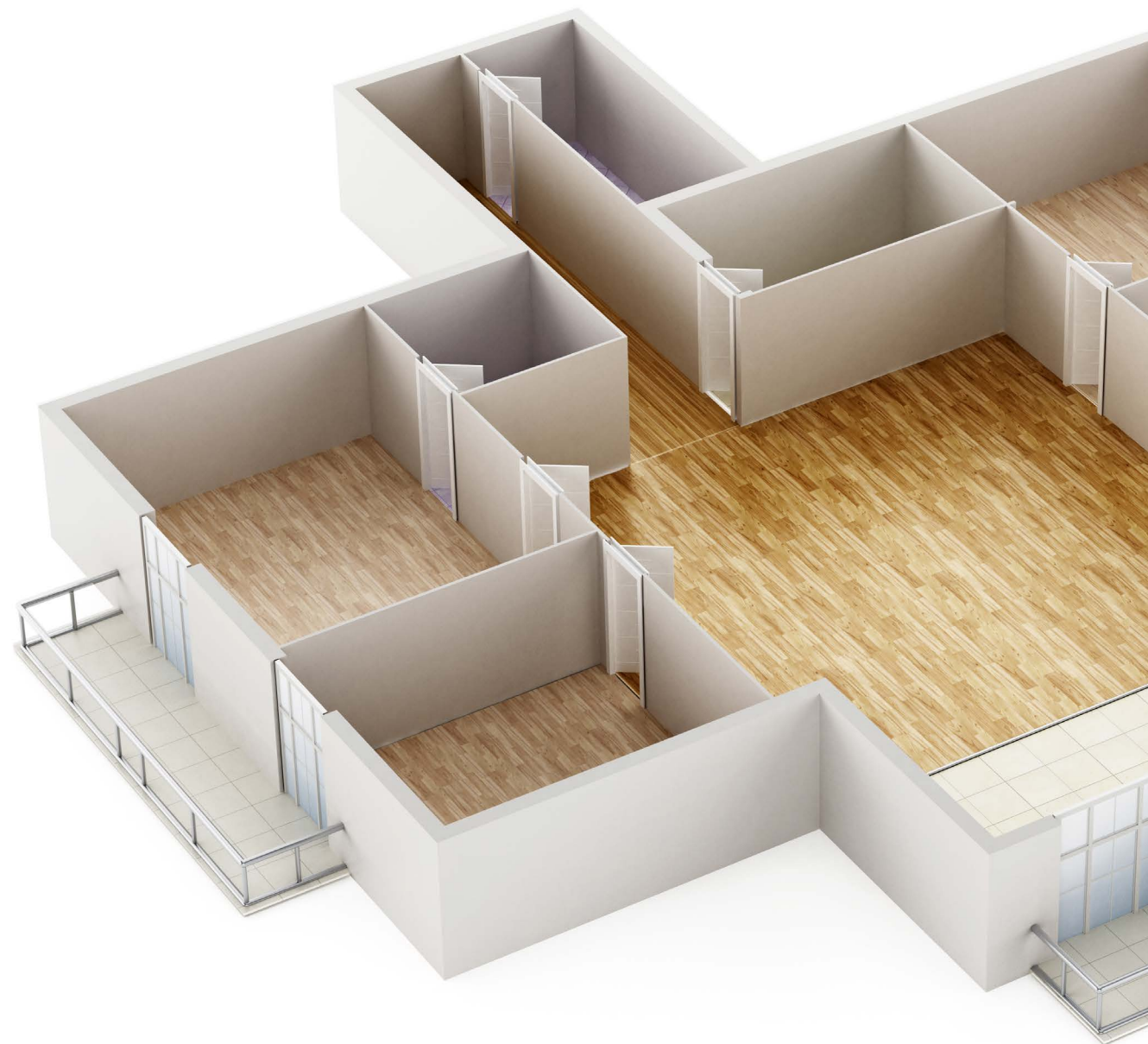
A Case Study in Efficiency

What does success look like with our new Hammerhead FR flame retardant composite panels? In one example, a major modular builder needed a material that could check every box: fire safety compliance, quick installation, and cost control—all while aligning with sustainability goals.

They turned to Avient's panels as a smarter alternative to traditional materials. The results were immediate:

- **Approximately 20% savings** on material and labor costs
- Lightweight, large-format panels fast-tracked installation, **shaving about 30% off the project timeline**
- With flame resistant chemistry **integrated into the panel**, the materials met ASTM E84 Class A and passed NFPA 286 room burn standards without added complexity

While exact numbers remain confidential, the builder also reported notable reductions in both material waste and overall project costs. Not a bad return for rethinking traditional materials in favor of composites.





YOUR NEXT MOVE

What's Next?

The future of modular construction will be shaped by innovation. We designed our Hammerhead FR composite panels to keep pace with innovation's demands. Whether you're looking to deliver projects faster, simplify your process, or reduce labor costs, these panels are ready to help you get there.

Today's construction industry burdens—rising costs, stricter regulations, and the urgent demand for more units—aren't going away. But with the right materials, builders can go beyond meeting expectations. They can set a new standard.

Interested in testing thermoplastic composites for your next project?

To get material samples and engineering data on Hammerhead FR flame retardant composite panels, let's start a conversation. Together, we can redefine what's possible.

Contact us at **+1.844.4AVIENT (1.844.428.4368)** or visit **[avient.com](https://www.avient.com)**

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