

Baydur®



Composite Cladding

Ushering in the next generation
of residential siding



Residential siding (cladding) brings value to a home in two important ways: protecting the interior from the elements and contributing to its curb appeal.

Research from CPG Building Products indicates that nearly 50 percent of consumers and contractors demand better performance and high-quality aesthetics from their siding. Durability, moisture resistance, lighter weight and easier installation ranked as top areas in need of improvement, according to the study.

Now, there is a new material option available that addresses consumer concerns and meets rigorous performance demands: polyurethane/glass composite utilizing Baydur® polyurethanes from Covestro LLC.

Common materials commonly fall short of expectations

Vinyl, wood and fiber cement board are the materials most-often used for cladding and each offers its own benefits and drawbacks.



Today's vinyl siding is more durable and supplied in a greater variety of textures and colors than the vinyl products produced a few decades ago. However, it is not possible to produce the fine-grain pattern that is becoming increasingly sought-after by homeowners.



Wood siding has seen improvements with the introduction of improved weather-resistant pressed board siding. Yet mildew and rot continue to be a concern.



One of the newer products with high popularity is fiber cement board that gives a traditional clapboard appearance when installed. For consumers desiring a traditional look, this offers good aesthetics in a material that is more durable than traditional vinyl siding. However it is heavy and requires two people for installation.

Traditional cladding materials
(top to bottom: vinyl, wood, fiber cement board)

Material/Technology:

Polyurethane-based Long Fiber Technology

Application:

Composite technology for residential siding (cladding)



Polyurethane composite siding protects and beautifies

Polyurethane composites can produce components that are strong, lightweight and attractive. Because of these properties, these composites have become an attractive alternative to steel, aluminum and other polymers in a number of markets, from agricultural equipment and truck cabs to spas and hot tubs.

Now, CPG Building Products, a subsidiary of CPG International LLC, with support from Covestro LLC, has developed what is believed to be the first application of reinforced polymer composite siding for the residential market. Advancements in the Long Fiber Technology (LFT) process and Baydur® polyurethane chemistry, coupled with enhanced tooling and manufacturing techniques have made it possible to mass produce high-performance composite cladding that is attractive, lightweight, strong, and highly durable during and after installation.

Inside the Process

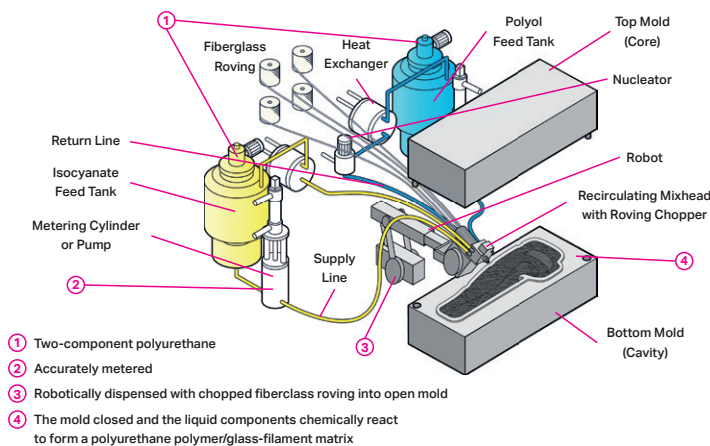
During the LFT process, long glass fibers (typically 12.5 mm to 100 mm or 0.5 in. to 4 in.) are cut and dispensed along with polyurethane resin in a one-step process. A dispensing mix-head, which is attached to the end of a robotic arm, is programmed to deliver material into a designed part mold. At the end of the pour, the mold is closed, and the part is formed. (see figure 1)

With the LFT process it is possible to mold large, intricate parts with thick or thin walls and very smooth, hard finished surfaces. By varying the amount of fiberglass reinforcement in different regions of the part, it is possible to have parts with concentrated high strength where it is most needed.

For the exterior siding application, the reinforced polymer composite cladding is produced using a low-density, rigid version of polyurethane LFT that is formed in a specialized multi-cavity tooling mold. The mold itself is designed with specifically designed landing areas for over-spray material to accumulate without impacting the compression of the product while it is being molded. Venting is also incorporated into the mold design to funnel excess air into a customized release area. These customized enhancements to the traditional LFT mold allow unique details to be incorporated into the product without a loss to productivity in the manufacturing process.

Figure 1: Polyurethane-based LFT

Polyurethane-based LFT (Long-Fiber Technology)



Composites technology enables multiple benefits

The robotically dispensed liquid pour of the LFT process allows the composite to replicate intricate details in the mold, providing a high quality, fine graining finish that is valued in the industry and virtually indistinguishable from real wood. (see figure 2)

LFT allows for a designed geometrical overlap at each end of the siding panel (figure 3). This forms a sealed end joint that eliminates the need for caulking during or after installation, improves longevity and reduces maintenance costs.

Should water enter the wall system, a water management system (figure 4) that is directly molded into the back face of the siding directs any water flow down and away from the wall system. These integrated engineered standoffs are a definite advantage to other systems that require additional clips or separate water management systems.

The cladding's polymer composite make-up is extremely resistant to moisture, rot and decay. The combination of high strength and light weight enhances ease of installation, as it can be lifted and installed by one person without significant risk of damage, unlike heavier fiber cement board. This is an important benefit for contractors that seek to reduce labor and scrap costs.

Installation is further eased by an overlap "scarf" design (figure 5) that allows the product to be installed simply by resting and interlocking each course of siding on the previously installed course for support while nailing.

Attachment can be completed with a pneumatic nail gun, versus pre-drilling pilot holes and installing with screw fasteners, providing further ease of installation. In the field, the polyurethane-based LFT siding can be cut to length using a common chop or power saw.

Figure 2

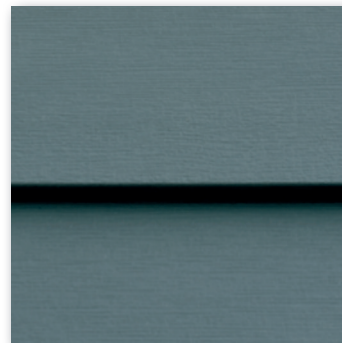


Figure 3



Figure 4



Figure 5





Polyurethane composites usher in the next generation of residential siding

Advancements in the Long Fiber Technology (LFT) process and development of unique Baydur® polyurethane chemistry, along with tooling and manufacturing techniques have made it possible to mass produce high-performance composite cladding that is attractive, lightweight, strong, and highly durable during and after installation.

The new siding material offers a number of installation benefits for contractors. There is also good news for homeowners, who can now choose a residential siding material that offers the combination of aesthetics, longevity and ease of maintenance they've been looking for.

	Wood Siding	Vinyl Siding	Fiber Cement Board	Polyurethane LFT Siding
Excellent Aesthetics	✓	✗	✓	✓
Enhanced Joining	✓	✓	✗	✓
Easy to Install	✓	✓	✗	✓
Durability to Impact	✓	✗	✓	✓
Moisture & Rot Resistance	✗	✓	✓	✓

For more information about Covestro LLC polyurethane materials and technologies, call 412-413-7454 or visit www.polyurethanes.covestro.com.



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