



Installing a Patio Cover

Polycarbonate panels covering this free-standing pergola let in light and block out the rain

by José Mullet

Recently, my company installed a patio cover for my aunt as part of a full exterior makeover of her house. The project also included a complete gut and interior and exterior rebuild of her rental property next door. The covered pergola described in this article was the finishing detail of the fairly involved makeover of the two properties, which are located in a small, rural town on the outskirts of Waco, Texas.

We had closed in the original front porch to add some living space, so we designed the pergola to provide a new sheltered entry and some curb appeal as well. But while my aunt wanted a covered porch, she also wanted to allow natural

light into the front windows of the house, particularly the front kitchen window. These considerations guided her choice of a clear cover. Our research led us to Regal Plastics' Hercules System, which consists of commercial-grade, four-walled polycarbonate sheets and the accessories needed for their installation.

The 8mm-thick sheets measure a little less than 24 inches wide and are available in 12-, 16-, 24-, and 28-foot lengths. Custom lengths are also available; we ordered for coverage of 12 feet 6 inches and received 13-foot-long sheets. We installed what the company calls "clear" sheets, which offer 69% light transmission; bronze (32% light transmission)

and ice white (22% light transmission) are also available. The UV-resistant sheets have a standing seam design to prevent leaks and are rated for winds up to 125 mph and snow loads of 40 pounds per square foot.

This was our first time using this particular system, and we found the panels to be a much higher quality product than what is often sold with greenhouse kits. They can be ordered directly through the manufacturer's Cover Your Pergola website (coveryourpergola.com) and delivered directly to the jobsite, but in this case, we picked up the panels at the company's nearest warehouse, which for us is in Austin, Texas.

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Figure 1. The pergola's support posts bear on the concrete patio and on 16-by-16-inch piers (A). The author uses one jig to shape the ends of the double 2x12 beams (B) and another one to shape the 2x6 rafters (C). Decorative hardware is used to hang the 2x12 beams from the pergola's 6x6 support posts (D). A simple guide made out of scrap material allows the author to make the clean and accurate 45-degree-angle cuts needed for the diagonal braces that reinforce the post-to-beam connection (E). Long structural screws fasten the 2x6 rafters to the beams (F).

Foundation

We had initially sized and poured a patio for a smaller, traditional front porch, but as our client's plans for the porch changed and its size grew, we decided to go with a free-standing structure instead of attaching it to the house. To clear a hipped roof corner on one end, we pushed the overall height of the pergola up above

the eaves with a beam bearing on three 6x6 posts. These posts are located close to the front of the house and are connected to the patio slab with decorative powder-coated galvanized-steel post bases made by Ozco Building Products.

Since the concrete patio that we had placed wasn't deep enough to support the posts for the front beam of the large

er porch roof, we formed and poured in place three 20-inch-deep 16-by-16-inch concrete piers (there's no frostline in Waco) reinforced with a simple #4 rebar grid. These piers are located 10 feet from the front of the house and have a washed aggregate finish so that they will blend in with the owner's future landscaping plans.

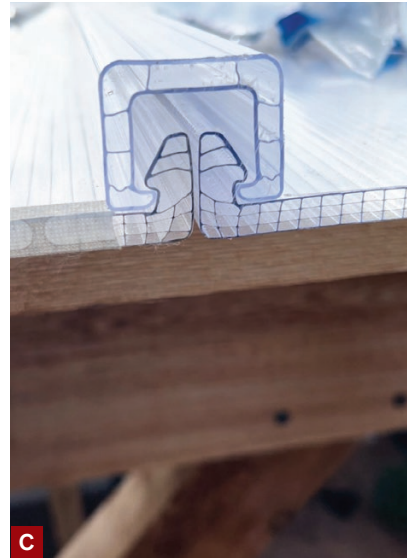


Figure 2. Angle brackets are used to fasten the rafters to the beams, along with structural screws driven down through the tops of the rafters (A). The roof panels are supported by 2x4 purlins and are fastened to them with special metal clips (B). Friction-fit connector caps are tapped into place with a mallet to cover the raised seams between panels and prevent leakage (C), then plugged with matching end caps (D). The ends of the hollow panels are covered with a special vent tape followed by a flute cover, allowing for ventilation while blocking access to insects (E). The outside edge of the last panel is cut to fit, then covered with a metal U-edge profile that is screwed to the purlins (F).

Framing

We framed the roof structure with rough-sawn western red cedar, using 6x6 material for the posts and diagonal braces, 2x12 stock for the two double beams that bear on the posts, and 2x6 stock for the rafters, which are spaced 24 inches on-center.

Beams. Prior to installing the dou-

ble 2x12 beams, we profiled their ends using a router guided by a jig that my dad had made for previous projects. After lifting the beams into position, we connected them to the posts with black Ozco hardware that matches the post-base hardware. I've been fortunate to learn from multiple talented old-school craftspeople, so making jigs to minimize

human error has become a natural part of the way I work.

Diagonal braces. We don't build a lot of pergolas or work with large timbers often and don't have a beam saw with the capacity to cut through 6x6 stock in one pass. So I made a quick 45-degree jig to make the cuts for the diagonal braces; along with the jig, I used a circular saw

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Figure 3. Raising the inner beam of the free-standing pergola above the eaves of the home's hipped roof allows for air circulation as well as the recommended slope (1 inch in 4 feet) for the polycarbonate roof panels (A). The panels chosen for this patio cover allow plenty of natural light into the home while providing shelter from rain and snow (B).

to make clean cuts on both sides of the workpiece and then finished the cut with a reciprocating saw. To ensure nice fits, I cleaned up high spots as needed with a 24-grit sanding pad fitted to an angle grinder. I used Simpson Strong-Tie Outdoor Accents structural screws to fasten the diagonal braces to the posts.

Rafters. After making the seat cuts on both the upper and lower ends of the rafters, we profiled them using a router and another jig with a slightly different profile than the one we used on the beams. We fastened the rafters to the beams 24 inches on-center with 8-inch-long Simpson Strong-Tie structural screws. On the low side of each beam, we added Ozco rafter clips, which helped plumb the rafters.

Purlins. To support the roofing panels, we installed 2x4 purlins 16 inches on-center, fastening them to the rafters with 3-inch-long stainless steel screws.

Roof System

Everything needed to install the Hercules roof panels was supplied with the

order, and the panels proved to be fairly simple to install. They come with a protective film on both the top and the bottom of the panel; we removed the bottom film prior to panel installation. We left the top film in place until the sheets had been installed, and even then only partially removed it along the edges to install the seam covers. Only after we finished the install did we fully remove the top film. Following the manufacturer's instructions, we covered the top edge of each panel with the supplied vent tape, then installed the flute covers over the vent tape prior to lifting the panel up into position.

Starting at the middle of the porch, we installed the first panel using the supplied metal clips along both edges. Then we worked toward both ends of the porch, connecting each panel along one edge to the clips holding the previous panel, and fastening down the other edge with more metal clips. As each new panel was installed, we used a rubber mallet to tap down the connector caps

that cover each seam. Those caps then were fitted with end caps.

As anyone who has installed metal roofing panels can tell you, roofs are rarely perfectly square. Because these panels arrived a few inches longer than their nominal length, we could easily trim them to length and—at the edges of the porch—to width with a circular saw. Those cuts were later covered with edge U-profile trim pieces, which added another 1/2 inch to the length and width of the panel (and thus must be accounted for when calculating the size of the end panels). Stainless steel screws driven through the metal trim pieces—but not through the panels themselves—secured the perimeter of the roof covering to the framing. ❖

José Mullet operates Mullet Carpentry and Remodeling along with his father, Alfredo, who owns the Waco, Texas-based company. He currently is the director of construction for Waco Habitat for Humanity. You can find José on Instagram @mullet_carpentry and on TikTok @josemullet.