BALDWIN PERGOLAS

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CSI MASTERFORMAT SPECIFICATION

FIBERGLASS REINFORCED POLYMER PERGOLAS

PRIMARY: Section 12 93 13 — Site Furnishings: Pergolas
CROSS-REFERENCE: 03 30 00 · 05 05 23 · 32 90 00

See also: Division 13 — Special Construction (large custom-engineered projects)

Custom pultruded fiberglass reinforced polymer pergola structures, factory finished, engineered to ASCE/SEI 7-16, manufactured by Baldwin Pergolas since 1987.

Specifier Note: Text in [BRACKETS] requires project-specific completion by the specifier. Delete inapplicable options. Coordinate with project drawings and other specification sections.

PART 1 — GENERAL

1.01 SECTION INCLUDES

This section covers the design, fabrication, finishing, and installation of custom pultruded fiberglass reinforced polymer (FRP) pergola structures manufactured by **Baldwin Pergolas**, 440 Middlefield Street, Middletown, Connecticut 06457, including all structural members, columns, hardware, electrical integration, and finish systems as shown on the drawings and as specified herein.

- Pultruded FRP structural members — beams, rafters, purlins, and ledger (attached configurations)
- Cast fiberglass columns, capitals, and bases
- Aluminum distribution boxes, base plates, and cap plates
- Stainless steel anchor system and all structural hardware
- HDPE mounting blocks and CNC-cut positioning templates
- Factory finishing in climate-controlled paint facility
- Electrical rough-in as scheduled — outlets, fan circuits, downlights, uplights
- Anchoring to concrete footings or existing structure
- Complete installation including leveling, plumbing, and final tightening

1.02 CLASSIFICATION AND CROSS-REFERENCES

This work is classified under the following CSI MasterFormat section. Cross-references are provided for related sections most likely to be used in the same project specification.

Section	Title	Role
12 93 13	Site Furnishings: Pergolas	Primary section — manufactured pergola systems
03 30 00	Cast-in-Place Concrete	Footings by others — coordinate anchor locations
05 05 23	Metal Fastenings	Stainless steel hardware specifications
32 90 00	Exterior Improvements	Site context, paving, landscaping coordination
Division 13	Special Construction	Alternate classification for large custom-engineered pergola projects on federal, university, or major institutional work

Specifier Note: Section 12 93 13 is the preferred primary classification for manufactured pergola systems in commercial submittals and product databases. For very large, custom-engineered pergola projects on federal, university, or major institutional work, consider an alternate specification under Division 13 — Special Construction. For routine commercial submittals, 12 93 13 provides better discoverability than structural framing sections.

1.03 SUBMITTALS

Submit the following in accordance with Section 01 33 00 — Submittal Procedures:

Product Data

- Manufacturer's product data including component descriptions, material specifications, and finish options
- FRP mechanical property data with ASTM test references
- Stainless steel hardware specifications with ASTM references
- Simpson Strong-Tie AT-3G adhesive technical data sheet and ICC-ES report
- Paint system data sheets

Shop Drawings

Note to Specifier and Contractor: Baldwin Pergolas shop drawings contain proprietary connection details, manufacturing dimensions, and design information. Baldwin Pergolas requires a brief consultation with the specifier or architect of record prior to transmitting shop drawings on commercial projects. This conversation ensures that drawings are reviewed in proper context and that Baldwin's proprietary information is appropriately protected. Contact Baldwin Pergolas at sales@baldwinpergolas.com or 800-344-5103 to initiate the review process. Shop drawings will be transmitted promptly following this consultation.

The standard five-sheet drawing package includes:

- Sheet 1 — ISO View: three-dimensional isometric showing complete structure and spatial relationships
- Sheet 2 — Plan View: column centers, bay dimensions, rafter and purlin spacing, overall footprint (scale 1:20 typical)
- Sheet 3 — Elevations: front and side with all critical heights, beam depth, capital dimensions (scale 1:20 typical)
- Sheet 4 — Rendering: photorealistic three-quarter view with scale figures
- Sheet 5 — Rendering: straight elevation view
- Detail A and Detail B — ledger connection plan/section and isometric (attached configurations, scale 1:4)
- Footing plan with anchor stud locations and dimensions

Engineering

- PE-stamped structural drawings for all commercial and permitted projects
- Structural calculations demonstrating compliance with ASCE/SEI 7-16
- Adhesive anchor calculations per ICC-ES AC308
- Engineer licensed in the project jurisdiction

Samples

- Paint chip in project-specified color for Owner approval prior to production
- Sample rafter tail profile in specified style — 12" minimum length

1.04 REFERENCES AND STANDARDS

Standard	Description
ASCE/SEI 7-16	Minimum Design Loads — governing wind and snow standard
IBC	International Building Code — adopted by authority having jurisdiction
Fiberglass Design Manual	FRP-specific design equations — local buckling, deflection, shear
ASTM D638	Tensile Properties of Plastics
ASTM D790	Flexural Properties of Plastics
ASTM D695	Compressive Properties of Rigid Plastics
ASTM D570	Water Absorption of Plastics
ASTM E84	Surface Burning Characteristics — smoke density and fire classification
ASTM F593	Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM A563	Carbon and Alloy Steel Nuts
ASTM B209	Aluminum and Aluminum-Alloy Sheet and Plate
ASTM F606	Mechanical Properties — Threaded Fasteners
NFPA 70	National Electrical Code

ICC-ES AC308	Post-Installed Adhesive Anchors — AT-3G adhesive

1.05 QUALITY ASSURANCE

Manufacturer Qualifications

Manufacturer shall have a minimum of 30 years of continuous experience in the fabrication and installation of custom pultruded fiberglass outdoor structures. Manufacturer shall operate a dedicated climate-controlled paint facility and CNC fabrication equipment capable of tolerances to 0.001 inch.

Basis of Design: Baldwin Pergolas, 440 Middlefield Street, Middletown, CT 06457. Tel: 800-344-5103. Email: sales@baldwinpergolas.com. Web: baldwinpergolas.com.

Substitutions shall be permitted only upon submission of complete technical documentation demonstrating equivalency in structural performance, material quality, finish system, engineering support, manufacturing capability, and installation methodology. The burden of proving equivalency rests entirely with the proposing manufacturer.

Proposed substitutions shall demonstrate equivalent performance including, but not limited to: pre-cambered pultrusions specified at the point of manufacture, CNC fabrication tolerances, end-sealing methods, structural connection systems, finish quality and cure duration, and availability of project-specific PE-stamped engineering.

Structural Engineering

All structural design shall be performed by a licensed Professional Engineer holding licensure in the project jurisdiction. Structural analysis shall comply with ASCE/SEI 7-16 using 3-second gust wind speeds for the project exposure category and risk category. Design wind speed: **130 mph minimum** unless project conditions require otherwise.

Pre-Installation Conference

Conduct a pre-installation conference prior to beginning work. Attendees shall include the general contractor, electrical subcontractor, concrete subcontractor, and Baldwin Pergolas installation representative or authorized installer.

1.06 WARRANTY

Baldwin Pergolas provides the following limited warranties from the date of installation:

Coverage	Duration	Scope
Structural Materials	10 years	FRP members, columns, capitals, aluminum connections, SS hardware — defects in materials and manufacturing
Workmanship	2 years	Fabrication workmanship; installation workmanship where installed by Baldwin Pergolas
Factory Finish	1 year	Peeling, blistering, or loss of adhesion caused by defects in factory application
Stainless Hardware	Useful life of structure	Corrosion failure under normal environmental conditions

This warranty is transferable to subsequent property owners during the warranty period provided the structure remains at its original location and has not been modified. A complete warranty document is available upon request. *Marketing headline: "10-Year Structural Warranty."*

1.07 DELIVERY, STORAGE, AND HANDLING

- All components shall be factory-finished before shipment. Field finishing not permitted except for minor touch-up.

- Inspect all components upon delivery and document any shipping damage before accepting delivery.
- Store on a flat, level surface, off the ground, protected from weather and UV exposure.
- Handle with appropriate equipment to avoid point loading on finished surfaces.
- Every shipment includes a touch-up kit with project paint, brushes, and written instructions.

PART 2 — PRODUCTS

2.01 MANUFACTURER

Baldwin Pergolas, 440 Middlefield Street, Middletown, CT 06457. Tel: 800-344-5103. Email: sales@baldwinpergolas.com. Web: baldwinpergolas.com. Founded 1987. 68,000 sq ft manufacturing facility. See Section 1.05 for substitution requirements.

2.02 PULTRUDED FRP STRUCTURAL MEMBERS

Minimum Mechanical Properties

Property	Minimum Value	Test Method
Tensile Strength	30,000 psi	ASTM D638
Tensile Modulus	2.9 × 10■ psi	ASTM D638
Transverse Tensile Strength	3,400 psi	—
Compressive Strength	30,000 psi	ASTM D695
Flexural Strength	30,000 psi	ASTM D790
Flexural Modulus	1.2 × 10■ psi	ASTM D790
Density	0.065 lb/in³	ASTM D792
24-hr Water Absorption	0.15% max	ASTM D570
Thermal Expansion	5 × 10■■ in/in/°F	—
Fire Classification	NFPA Class A / UBC Class 1	ASTM E84-01
Smoke Density	Below 450	ASTM E84-01

Member Profiles

Member	Nominal Size	Wall	Notes
Standard beam / rafter	2" × 8"	0.125"	Pre-cambered 3/8"–1/2" crown at pultrusion
Heavy-span beam	4" × 12"	0.250" flanges / 0.125" webs	Pre-cambered; large commercial spans
Purlin	2" × 3"	0.125"	Upright (3" tall) or flat; CNC-notched bottom
Fiberglass ledger	2" × 8"	0.125"	Attached configurations; hollow for electrical

Pre-Cambered Crown

All beams shall be ordered with 3/8"–1/2" upward crown over 20 ft, specified at pultrusion. Crown shall not be achieved through shimming or field adjustment. Beams shall maintain a net positive crown or level profile under full dead load after installation.

End Sealing

All hollow member ends shall be sealed with marine-grade epoxy (West Systems or approved equal) combined with chopped fiberglass roving, vacuum-degassed before application, and CNC-milled flush after cure. Polyester body filler is not an approved end-sealing material.

Drainage

Members shall drain by geometry. Rafters and purlins shall be CNC-notched on their bottom faces at all beam crossings. Beam wire-entry holes double as drainage ports. Where positive ventilation is required, a louvered round vent fitting shall be installed in a 1" diameter hole with latex caulk, painted to match.

2.03 COLUMNS, CAPITALS, AND BASES

Column Shafts

Pultruded fiberglass, hollow, in the profile specified on drawings. Available profiles: Round Tapered Plain, Round Tapered Fluted, Round Non-Tapered Plain, Round Non-Tapered Twist/Rope, Round Barrel, Square Non-Tapered Plain, Square Non-Tapered Panel, Square Fluted, Square Tapered Plain.

Profile: **[INSERT]** | Diameter / Width: **[INSERT]** | Height: **[INSERT]**

Capitals and Bases — Cast Fiberglass

Cast fiberglass reinforced polymer — calcium carbonate filler, chopped fiberglass strand, polyester resin. Foam, urethane, and injection-molded plastic capitals are not acceptable. Each capital CNC-machined to receive column with 1/16" clearance per side. Capital-to-base plate: 12.75" × 3/8"-deep CNC recess, 3M Marine Adhesive — 51 linear inches of contact, rated for below-waterline use. No mechanical fasteners at this connection.

2.04 DISTRIBUTION BOX AND COLUMN-TOP ASSEMBLY

The column-top distribution box shall be a 5" × 5" pultruded FRP extrusion, 8.75" tall, 1/4" wall, simultaneously serving as structural beam connection hub, electrical distribution point, and column hold-down anchor receiver.

- Capital plate: 14" × 14" × 3/8" aluminum, 6061, ASTM B209, set in 3M Marine Adhesive in CNC-machined capital recess
- D-box top plate: 5" × 5" × 3/8" aluminum, 1/16"×1/4" rabbet on all four edges for self-alignment, central hole for threaded rod
- Beam connection: CNC-machined fiberglass keystone plates with crush blocks — 6 screws per beam, 12 total per column
- Tensioning: nut torqued to 100 ft-lb creates spring-loaded compression through assembly: top plate → D-box → capital plate → column → footing
- D-box groove in capital plate ensures perfect centering and squareness over column

2.05 HARDWARE — ALL STAINLESS STEEL

All structural hardware shall be stainless steel. Galvanized, zinc-plated, or carbon steel hardware is not permitted at any location.

Component	Specification
Anchor stud	5/8" × 16" SS, ASTM F593, 11 TPI
Coupler	ASTM A563, 5/8"-11
Threaded rod (through column)	5/8" SS, ASTM F593 (upgrade to 3/4" or 1" for high-wind)
D-box top plate nut	SS, ASTM F593 — torqued to 100 ft-lb
Rafter screws	8" SS, ASTM F606-10 / D6294 / NASM 1312-20, with snap cap
Purlin screws	#10 × 3" SS, ASTM F593-91, with hinge cap
Lag screws (ledger)	1/4" × 6" SS, 2 per HDPE block, 2.5" min penetration
Rafter-to-ledger screws	1-5/8" #10-8 410 SS, 2 per rafter top, 2 per side

HDPE block fasteners	1/4" SS self-tapping, 3/8" hex head

2.06 HDPE MOUNTING BLOCKS

High-density polyethylene (HDPE), UV-stabilized, virgin resin. Minimum tensile strength 26 MPa (ASTM D638). Minimum flexural modulus 800 MPa (ASTM D790). Service temperature –50°C to 80°C. Moisture absorption essentially zero. No grain direction — fasteners may be placed in any orientation without splitting risk. Service life 50–100+ years.

Block positioning shall use CNC-cut 1/2" plywood templates sized to the column profile. Templates ensure accurate placement without field measurement.

2.07 ANCHOR ADHESIVE

Simpson Strong-Tie AT-3G Hybrid Acrylic Anchoring Adhesive, or approved equal.

- Type: Hybrid acrylic, two-component, 10:1 mix ratio
- Concrete conditions: Cracked and uncracked, dry and damp
- Working strength at 70°F: 45 minutes minimum
- Code compliance: IBC, IRC, ICC-ES AC308
- Tensile capacity: 16,950 lb per 5/8" anchor stud minimum
- Hole cleaning: Blow-brush-blow sequence

2.08 PAINT AND FINISH SYSTEM

Standard System

All FRP components shall be primed and finished in the manufacturer's climate-controlled paint facility before shipment. Minimum facility: 50'×50' floor area, full temperature and humidity control, filtered air, full-spectrum lighting for color verification.

- Primer: Benjamin Moore exterior primer
- Topcoat: Benjamin Moore exterior acrylic — any color
- Color: [INSERT — Benjamin Moore number, Sherwin-Williams, RAL, or physical sample]
- Cure: 7 days minimum before shipment — not negotiable

Project-Specified Custom Coatings

Where project specifications require a coating system other than Benjamin Moore (including Tnemec, PPG, or other high-performance industrial systems), Baldwin Pergolas will apply the specified system in its paint facility. Coordinate coating selection prior to contract.

2.09 STRUCTURAL DESIGN REQUIREMENTS

- Design standard: ASCE/SEI 7-16
- Design wind speed: 130 mph 3-second gust minimum — [INSERT per ASCE 7-16 for project location]
- Snow load: [INSERT per ASCE 7-16 for project location] — Northeast typical: 25–40 PSF ground snow
- Deflection limit: L/180 per IBC
- FRP flexure factor of safety: 2.5 minimum per Fiberglass Design Manual
- Twin-beam composite stiffness shall be calculated per parallel axis theorem including notched rafter composite action — CNC notches are structural interlocks, not material loss

PART 3 — EXECUTION

3.01 EXAMINATION

- Verify concrete footings are in place, fully cured (minimum 28 days), and within acceptable tolerance of the pergola site plan.
- Verify electrical conduit is stubbed out of footings at specified locations.
- For attached configurations, verify host building wall is structurally adequate for ledger loads.
- Do not begin installation if conditions are unacceptable. Notify GC and architect in writing.

3.02 PREPARATION

Layout and Footings

- Grind footing mounting surfaces smooth and flat using 5" angle grinder with diamond cup attachment.
- Mark column centers from pergola site plan. Verify squareness by diagonal measurement — match within 1/8".
- Snap chalk lines at 4.75" from column centers. Darken with permanent marker.

3.03 ANCHOR INSTALLATION

- Drill at column centers with rotary hammer, 11/16" × 12" concrete bit. Minimum 9" depth. Maintain perpendicular orientation.
- Clean holes: blow from bottom up, brush with 3/4" round wire brush, blow again.
- Load AT-3G. Purge nozzle until output is uniformly gray. Fill hole from bottom up. Insert stud with push-pull-twist motion.
- Allow full cure before loading: 45 minutes minimum at 70°F.

3.04 COLUMN INSTALLATION

- Calculate column lengths from laser level elevations at each footing and at ledger height (attached configurations).
- Cut columns and threaded rod to project-specific lengths.
- Two-person operation throughout. Lower threaded rod through hollow column from above. Thread into anchor stud coupler. Double-nut and tighten.
- Install capital, aluminum plate (in 3M Marine Adhesive), D-box, and D-box top plate.
- Plumb column on two adjacent faces using Baldwin fiberglass tapered shims. Snug nut — do not final-torque until beams are installed.

3.05 BEAM AND RAFTER INSTALLATION

- Two-person operation for beam installation.
- Route all electrical wiring through beams before rafter installation.
- Lift beam pair to capitals. Align pre-drilled holes with D-box. Install keystone plates and drive 6 screws per beam end (12 total per column).
- Install rafters with notches down over beams. Verify full seating in both notches before fastening.
- Drive one 8" rafter screw per beam crossing. Snap white plastic caps.
- Install purlins from above. Drive purlin screws through purlin into rafter tops. Snap hinge caps.

3.06 LEDGER INSTALLATION (ATTACHED CONFIGURATIONS)

- Position ledger at height established by elevation calculations. Check plumb at each HDPE block location.
- Fasten with 1/4" × 6" SS lag screws through pre-drilled holes, 2 per block. Minimum 2.5" penetration into framing.
- Apply silicone sealant at top edge of ledger only. Do not caulk ends or bottom.
- Install HDPE rafter blocks at each rafter location.

3.07 FINAL TIGHTENING AND COMPLETION

- Return to each column and torque D-box top plate nut to 100 ft-lb using 1/2" drive ratchet, 8" extension, 7/8" socket.
- Install pyramid caps and hex screw caps at keystone connections.
- Complete all electrical connections in D-boxes. Confirm watertight fittings.
- Inspect all surfaces. Apply touch-up finish at installation-caused damage.
- Clean site. Remove all tools, packaging, and debris.

3.08 INSTALLATION — OPTION A: BALDWIN PERGOLAS

Select when Baldwin Pergolas performs installation. Baldwin Pergolas installation team performs all work in Sections 3.01–3.07. Coordinate scheduling minimum 30 days in advance.

3.09 INSTALLATION — OPTION B: CONTRACTOR

Select when contractor installs using Baldwin kit delivery. Install per Baldwin Pergolas assembly instructions and this specification. Contractor shall contact Baldwin Pergolas prior to installation to review project-specific details. Technical support available by phone during installation.

3.10 FIELD QUALITY CONTROL

- Verify all columns plumb in both directions. Maximum tolerance: 1/8" per 8 ft of height.
- Verify all beams level within 1/4" over full span.
- Verify all rafter and purlin screws fully driven with caps seated.
- Verify electrical circuits complete and watertight fittings installed at all conduit entries.
- Verify touch-up paint applied at all installation damage.

3.11 CLEANING

- Clean all surfaces of adhesive, sealant, and construction residue.
- Remove all template materials, packaging, and debris from site.
- Protect installed work from damage by subsequent trades.

SPECIFICATION QUESTIONS AND PROJECT SUBMITTALS

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Use the online configurator to begin your design: baldwinpergolas.com/pergolas/fiberglass/pergola-configurator.php