



Standard Installation Guidelines

ARCHITECTURAL PANELS



Wood Profiles with Screws

+ RAINSCREEN APPLICATION
8MM PANELS

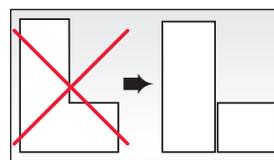


These guidelines represent an abbreviated illustration for proper installation of AFC Fiber Cement products in a ventilated rainscreen application. Additional guidelines for interior applications, hidden adhesive attachment, sealing, and weather barrier attachment can be found at americanfibercement.com.

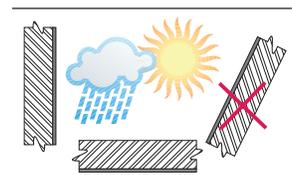
Note: The online copy of the Installation Guidelines obtained at americanfibercement.com supersedes any printed copy.

Construction Practices

1. Air space at top and bottom of building or wall termination to be 20 mm ($\frac{3}{4}$ "") to facilitate airflow from out behind the panels. Do not block vertical airflow at windows, doors, eaves, or at the base of the building. Airflow needs to be continuous from bottom to top so there is air movement behind each panel. See item 4 under Building/Structure on page 5 for proper profile depth based on wall height. 1" is required for walls between 15ft and 60ft. Vertical airflow behind the fiber cement panels is a critical necessity in rainscreen constructions.
2. For areas that receive moderate to high snowfall, panels must terminate 6 to 12 inches above grade line based on expected snow build-up.
3. A metal drip edge may be used at window heads, door heads and the panel base, but it must not restrict airflow ($\frac{3}{4}$ "; 1" at base openings).
4. Install panels from top of building to bottom.
5. For straight walls, start panel installation in center and work outward.
6. For walls with inside corners, start installation there and work across wall.
7. Jobsite storage:
 - Keep material laying flat, under cover, dry and protected with a waterproof tarp.
 - Transport material on edge.
 - Using a microfiber cloth, brush off any material dust generated by drilling or cutting prior to installation.
 - Do not use the shipping crates or pallets containing the fiber cement panels as a work surface. Keep panels dust-free.
8. For field cuts and drilling, use carbide or diamond blades/bits and slower turning/feed rates. AFC offers saw blades and drill bits.
9. Depending on the product type, Edge Sealer/Paint may or may not be required. See AFC's Fabrication, Maintenance, and Storage guidelines.

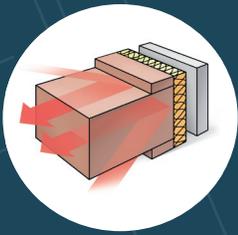


L or C-Shaped panels are not allowed.



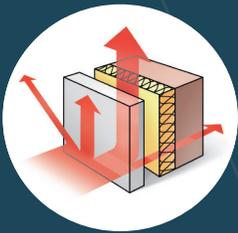
Panels exposed to weather (rain, sun) may only be assembled vertically. Soffit applications not exposed to weather are allowed.

Construction Practices



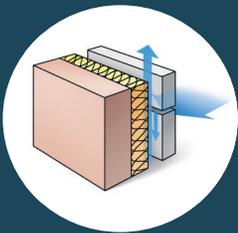
Preventing Thermal Bridges

As the insulating material is on the outside of the structural wall, it can easily be mounted without interruptions caused by floor slabs. In this way, any thermal bridges that occur at each floor slab can be prevented. These thermal bridges are also the cause of surface condensation that may result in fungus growth.



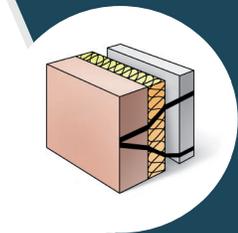
Dissipating Heat From the Sun

The ventilated rainscreen cladding system has a cooling effect when temperatures outside are high. Most of the sun's rays are reflected away from the building. Heat passing through the exterior wall panel is partially dissipated by the ventilating effect of the air space between the exterior cladding panel and the structural wall. Any residual heat managing to penetrate buildings is very minor.



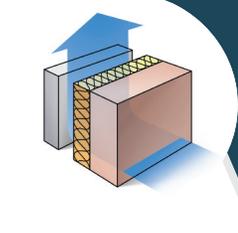
Rainscreen

Architectural wall-cladding panels act as a rainscreen on the outside of the building and keep the structural wall absolutely dry. The air space connected to the outside air evacuates water and humidity that might have penetrated behind the wall-cladding panels through its horizontal or vertical joints. This water will never reach the load-bearing wall and/or the thermal insulation.



Protecting the Basic Structure and Load-Bearing Wall Against Temperature Variations

In view of the fact that the insulation material is applied to the outside of the building, changes in temperature are very minor compared with those found in conventional constructions where insulation is applied on the interior. This principle works in summer and winter, in both hot and cold climates.



Prevention of Internal Condensation

Insulation material can be applied to the outside of the structural wall because it is protected effectively by the architectural exterior wall panel. Because of differences in vapor pressure and temperature passing through the wall, condensation has been shown to occur close to the ventilated area and not in the structural wall itself. As a result, the ventilating effect is easily sufficient to dry out the thermal insulating material.

Building/Structure

VENTILATED RAINSCREEN APPLICATION

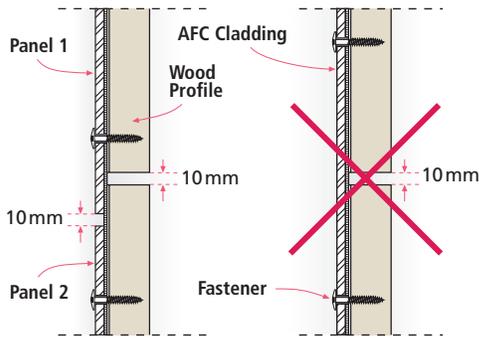
- Architect/Engineer/Contractor to design and build structurally sound, water-tight exterior wall.**
 - Substructure Horizontal Straightness Tolerance: ± 3.0 mm per 2m (± 0.0625 " per 42")
 - Substructure Vertical Straightness Tolerance: ± 0.5 mm per 600mm (± 0.0625 " per 75")

If the wall is not straight, the profiles should be shimmed to create a flat plane for the panels. Shims should not be used between the profile and the panel.
- Attach wood profiles to exterior walls. Structural engineer to determine fastening specification, i.e.** quantity and type of attachment and fasteners, as well as the dimensions and species of wood profiles compatible with exterior wall construction (FIG. J). Attachment must be sufficient to support 3.2 lbs/ft² (8 mm panel) dead load, plus design wind loads.
- The quality of the wood must be consistent with prevailing standards in the area. The wood should be pressure treated construction grade lumber with a smooth surface finish. Fungi-resistant woods are required, but must not be treated with agents that are corrosive to stainless steel screws.
- Vertical profiles for affixing panels must be the following depth to allow for optimal air flow and water drainage:
 - 19 mm (¾") for panel runs 0–15 ft (1x2 or 1x4)
 - 38 mm (1½") for panel runs 15–150 ft (2x2 or 2x4)

For buildings over 150 feet high, special provisions are required; check with your AFC Cladding representative.

- Profile width at vertical joints to be ≥ 90 mm (3½") minimum, and interior profile width to be ≥ 38 mm (1½") or greater, to allow tolerances in alignment. Maximum length of wood profile ≤ 12 feet. Minimum screw depth in wood profile is 19 mm (¾").
- Profiles to be straight, plumb, level and aligned correctly on the building. For installations without exterior insulation, the wood profiles are typically 2x2 or 2x4 pressure treated lumber affixed directly to the exterior wall, provided the sheathing has adequate screw-holding strength. (See FIG. J)
- It is recommended to take field measurements before panels are cut or drilled.** Field measurements verify print dimensions to ensure proper fit.
- Joints between vertical wood profiles to be ≥ 10 mm (¾"). A joint between the vertical profiles must **always** coincide with a joint between the panels (FIG. A). The joint is preferably continued at the same horizontal height among adjacent profiles (reduces stress in panel). If a two layer system is used, the same concept must be applied for the horizontal profiles. 20 mm spacing, and coincide a joint between panels with a joint between horizontal profiles.
- For structures with **exterior insulation**, follow the insulation manufacturer's installation instructions. Horizontal wood profiles (the same depth as the exterior insulation) can be attached to the exterior wall. Vertical wood profiles are then attached to the horizontal profiles (FIG. D-2).

FIG. A



A Typical Vertical Joint

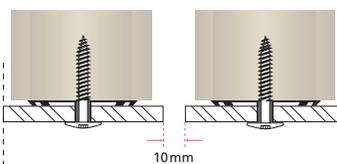


FIG. B-1

Alternative:
Use one 90 mm wide profile

FIG. B-2
Interior Profile

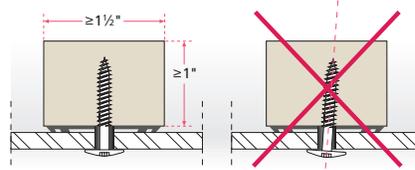
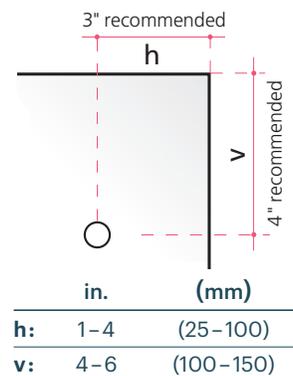


FIG. C



- Typical vertical and horizontal joints are left open and have a black background (use a black weather and UV resistant building wrap). Other reveal colors are possible if desired.
- At the vertical joints, the wood profile is covered with a 90 mm (3½") UV-resistant black EPDM rubber joint sealing strip with ribs (fig. H).
- The joint sealing strip can be applied with a chemically compatible spray adhesive, staples, or double-sided tape until panels are affixed with screws. The screws must be positioned between the ribs to permit penetrated water to run off.
- At interior wood profiles, a 38 mm (1½") UV-resistant black EPDM rubber sealing strip with ribs is applied. Spray adhesive, staples, or double-sided tape can be employed to hold up the strips until the panels are fastened.

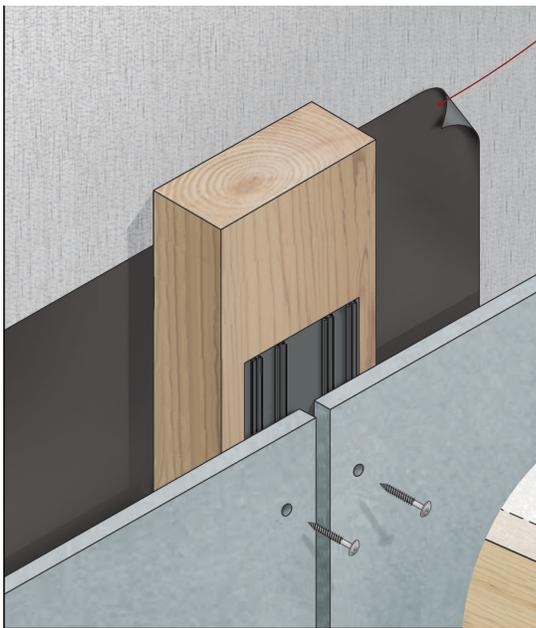
Profile Attachment – ILLUSTRATED

For wall assemblies utilizing exterior sheathing with low screw-holding strength, a two-layer attachment system may be required.

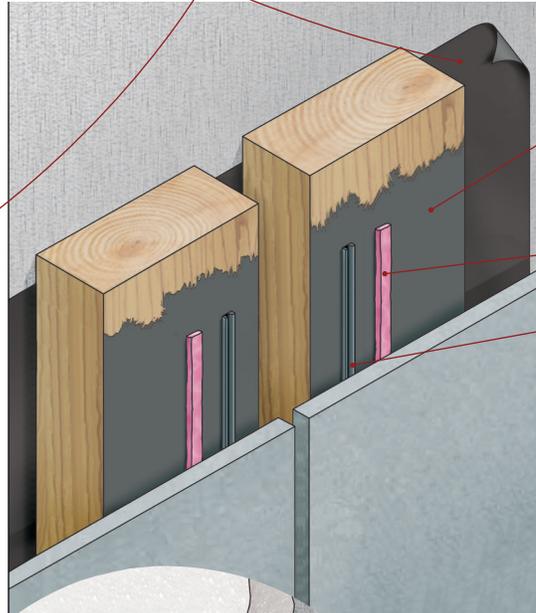
Contact your AFC representative or visit AFC's website for application instructions utilizing Dynamic Bond adhesive.

FIG. D-1-

Vertical profiles are attached using wood furring, without insulation.



Building wrap per AFC. Weather and UV resistant. Check local codes for proper placement.



Dynamic Bond installation and protection

Glue bead

Dynamic Tape

Options for building placement wrap

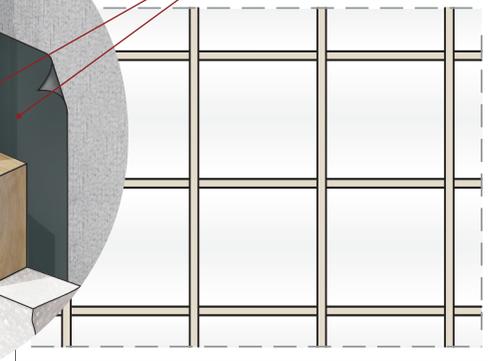
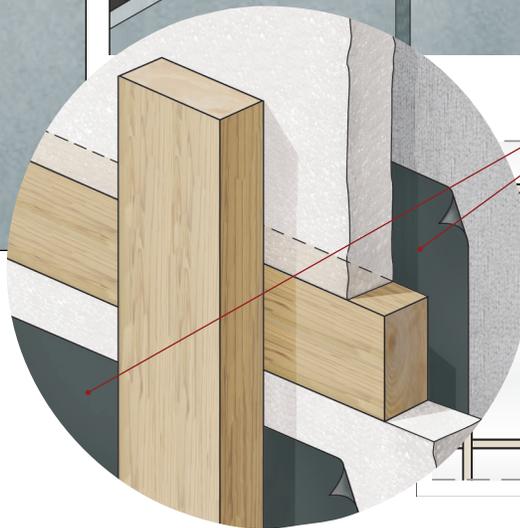


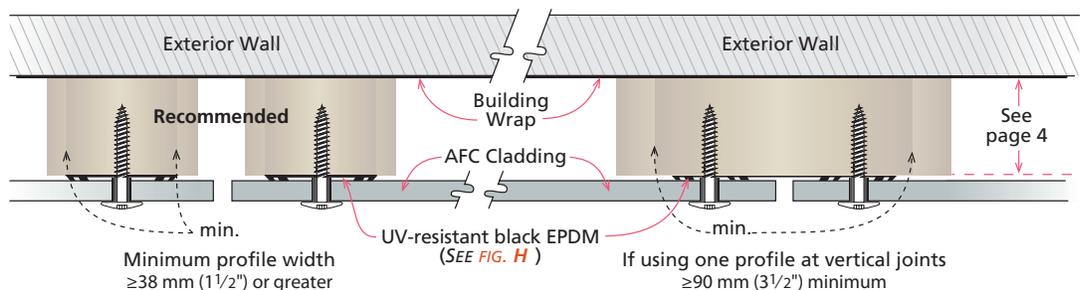
FIG. D-2-

Exterior insulation, when vertical profiles are attached to horizontal profiles affixed to wall.

Wood profiles can be vertically affixed directly to wall if there is no exterior insulation, provided sheathing has adequate screw-holding strength; (3/4" plywood sheathing is recommended).

FIG. J

Wood profiles: interior and vertical joint. Vertical joints may also use two ≥ 38 mm profiles (recommended) in place of one ≥ 90 mm profile.



Panels

VENTILATED RAINSCREEN APPLICATION

- Vertical and horizontal joints to be 10 mm ($\frac{3}{8}$ "). This is the minimum distance between the edges of two adjacent panels, or the distance from panel edge to metal trim extrusions or structural members. (See FIG. A)
- Pre-drill **all** fixed and gliding point holes in panel so that there are: (See FIG. E & F)
 - Two (2) **fixed points** per panel (F).
 - The rest of the holes are to be **gliding points** (G). (See FIG. E & F)
 - See **Fixing** section (and FIG. E & F) for determining location of fixed points in each panel.
- Diameter of the fixed point hole is to be 5mm — use #8 drill bit: 5.05 mm ($\frac{13}{64}$ ").
- Diameter of the gliding point hole is to be 8mm — use #0 drill bit: 8.02 mm ($\frac{5}{16}$ "). Drill bits supplied by AFC.
- Joints between profiles must coincide with joints in the panels. **Panels cannot bridge a break in the profiles.** (See FIG. A)
- Some AFC Fiber Cement products have a sanding grain that must be accounted for when positioning panels. Rotating some panels 90° from the orientation of adjacent panels can result in the appearance of color shading.
- After first affixing the two fixed point screws, affix the rivets in a manner moving from nearest the center of the panel to the outside ring. (See FIG. K)

Fixing

- The screw specifications for AFC Fiber Cement products must be respected. (See FIG. K)
- Fixing pattern is typically either 16" or 24" (max.) on center horizontally (based upon wood profile spacing) and 16" to 24" on center vertically, depending upon building height, building location, design criteria/specifications, and panel/fastener location on building. Edge areas on facades and high wind load conditions require closer fixing distances. For soffit applications, the maximum fastener spacing is 16" on center in both directions.
- Corner rivets to be located at 25 – 100 mm (1" – 4") horizontally and 100–150 mm (4" – 6") vertically from each corner of panel. (See FIG. C)
- 15mm ($\frac{5}{8}$ ") clearance is required from the edge of wood profile to screw location.
- Screws must be located in the center of each hole in the panel (FIG. B-1). They must be perpendicular to panel surface (FIG. B-2), and not be overtightened, which would prevent the panel's normal movement.**
- Two fixed points are required per panel. (FIGS. E & F) **Fixed points** (for attachment to vertical profiles) are:
 - Always the same height in each panel.
 - As close to center of panel as possible, and then either the next adjacent point to the left **or** right. Be consistent in panel-to-panel location (center and left **or** center and right, so fixed points are at the same level horizontally for attachment to vertical profiles).
 - No two fixed points on one panel can be on the same profile, and no two fixed points on two adjacent panels can be on the same profile.
 - For vertical narrow panel applications on vertical profiles, vertical joints must incorporate two separate profiles (as illustrated in *Details – Typical Vertical Panel Joint* on page 9).
- Aluminum joint closures can be installed (maximum thickness of finishing profile to be .8 mm or 21 gauge). Standard practice is to leave the joints open.
- Remove residue from drilling fixed and gliding holes prior to installing screws.

FIG. E -
Vertical installation
on vertical profiles

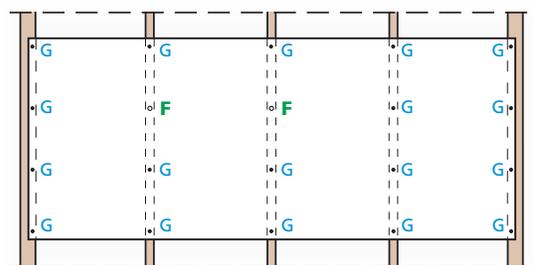
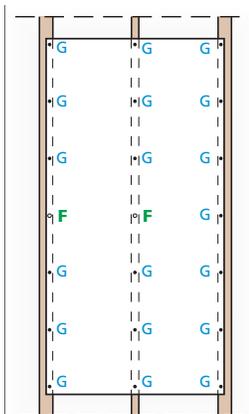
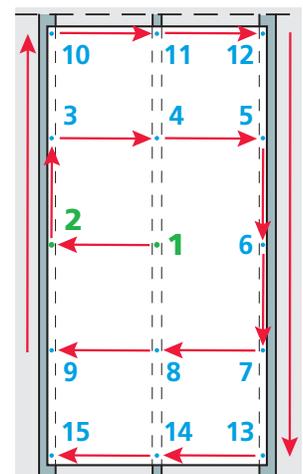


FIG. F -
Horizontal
installation
on vertical
profiles

If there is no perfectly centered row, the fixed points go one row up, as shown.

The screws are inserted using an electric drill with a high quality bit suitable for the type of screw head. AFC supplied screws have a Torx T20 head. The screws must be inserted perpendicular to the panel surface (FIG. B-2), and must not be over-tightened. Check torque setting frequently during installation of the panels. Overtightening will restrict the panels' freedom of movement that is necessary to accommodate changes in thermal and moisture conditions.

FIG. K -
Fixing sequence
Attach fixed points first.



Fabrication/Maintenance/Storage

See AFC Fabrication, Maintenance and Storage Guidelines

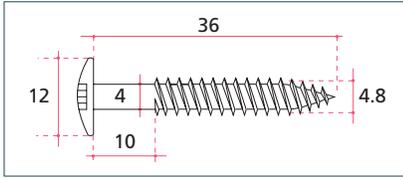


FIG. G -
Screw (supplied by AFC)

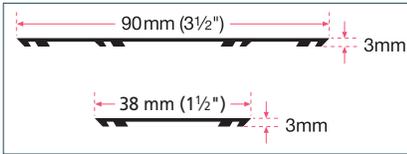
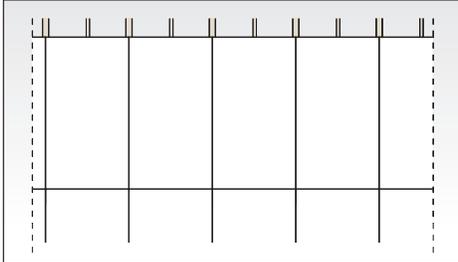


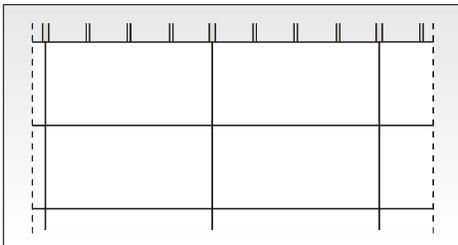
FIG. H -
UV-resistant EPDM rubber joint sealing strip with ribs (supplied by AFC)

Typical Pattern Layout

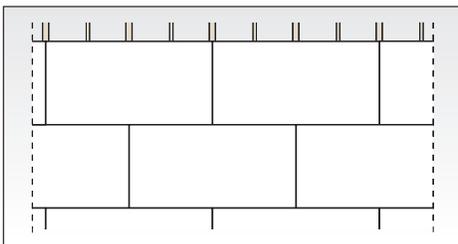
Panels can be used full size (4' x 8' or 4' x 10'), or fabricated to smaller dimensions.



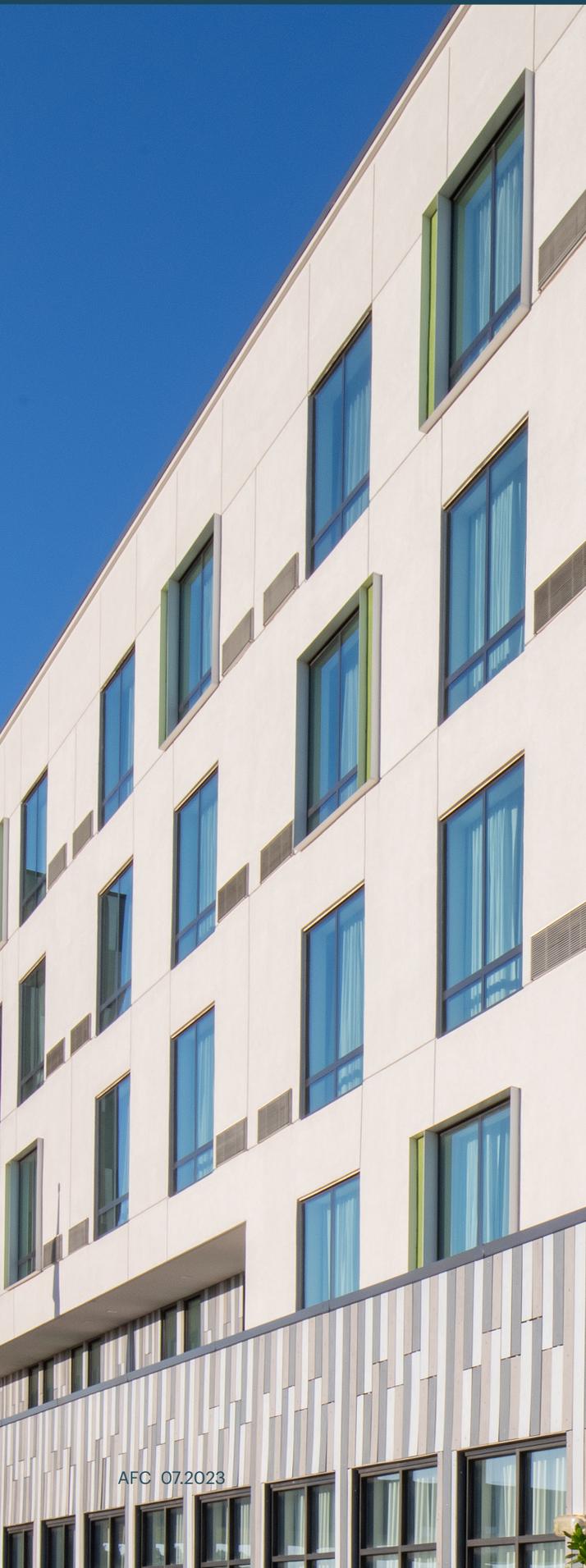
Straight pattern with vertical panels



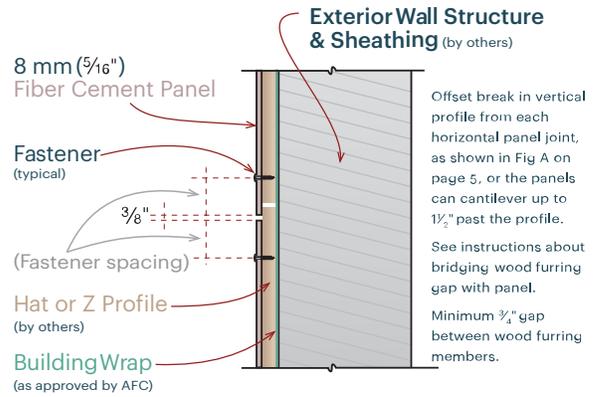
Straight pattern with horizontal panels



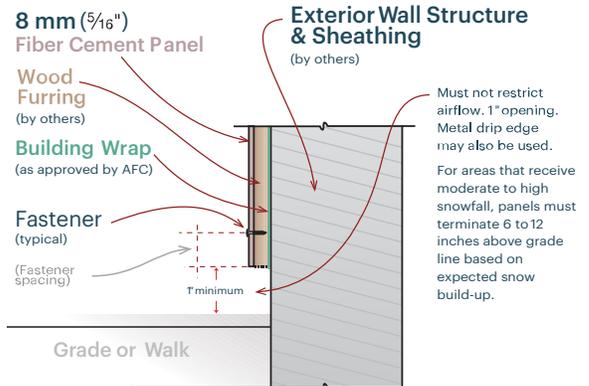
Semi pattern with horizontal panels



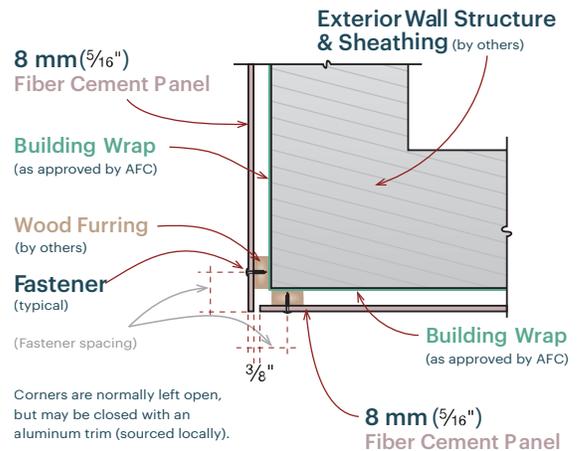
Typical Horizontal Panel Joint



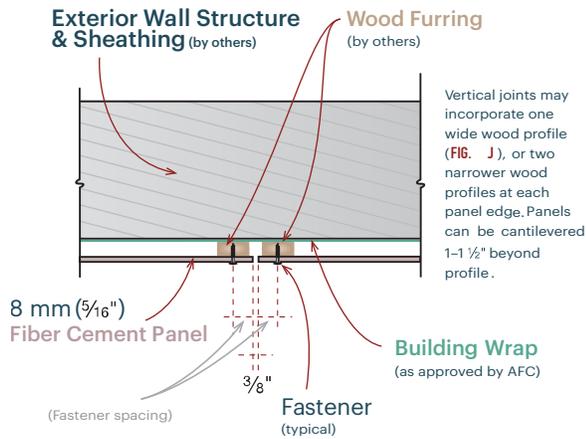
Typical Panel Base



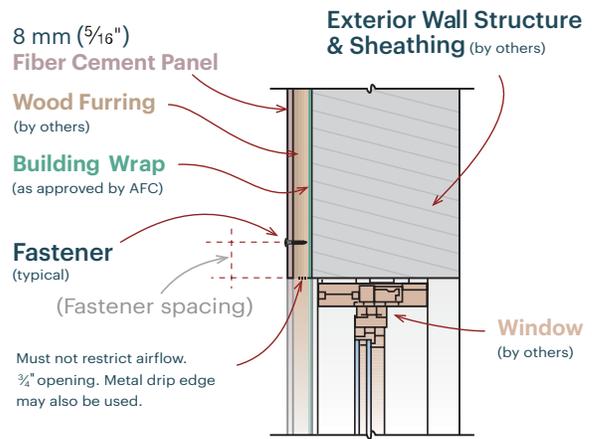
Typical Outside Corner – Plan View



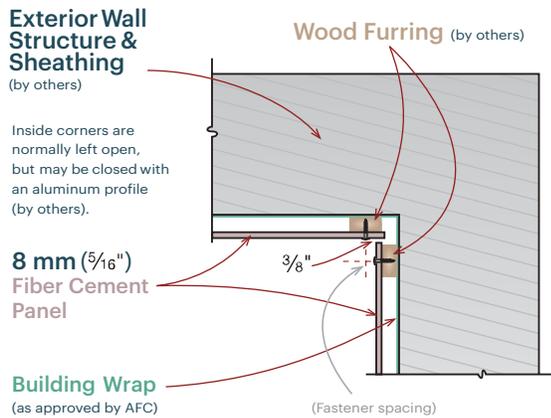
Typical Vertical Panel Joint



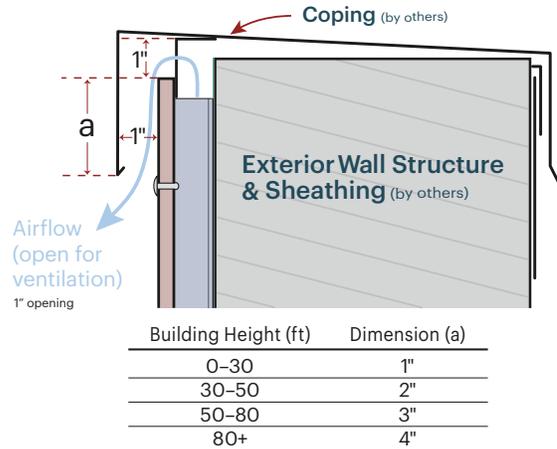
Typical Horizontal Panel Joint



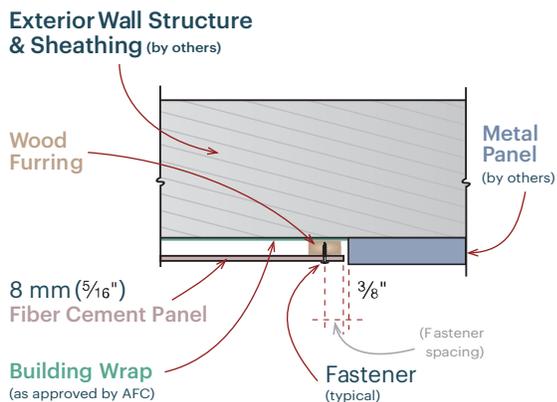
Typical Inside Corner – Plan View



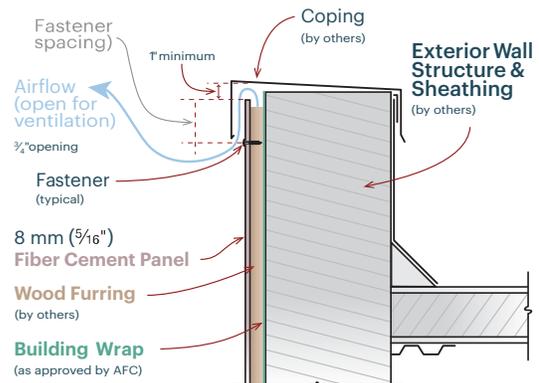
Parapet Coping – Closeup



Typical Panel End @ Metal Panel



Typical Outside Corner – Plan View



Product Sustainability Statement

AFC is committed to providing the highest quality high-density compressed fiber cement panels to the U.S. and Canadian building markets. In order to do this, we feel it necessary to provide not only high-quality products, but sustainable products that can contribute to green (LEED) building projects, which in turn benefit the environment we all live in. AFC products currently have a potential contribution to various LEED credits including but not limited to:

Direct Contribution

Materials and Resources:

- Environmental Product Declarations
- Material Ingredients
- Building Life-cycle Impact Reduction

Indirect Contribution

Indoor Environmental Quality:

- Thermal Comfort

Energy and Atmosphere:

- Optimize Energy Performance

One of the most important sustainable attributes is the durability of AFC panels. With their long lifespan, virtually requiring no refurbishment, AFC panels can contribute to less replacement of materials and to drastically lower maintenance costs over the useful life of the building.

The Ventilated and Insulated Rainscreen Cladding (VIRSC) system, which is used to affix AFC panels to the exterior of a structure, offers many benefits and green attributes to the performance of the building envelope. Durability and resistance to moisture and mold build-up are noteworthy benefits. Equally important is its ability to accommodate external insulation.

In addition, AFC is dedicated to further research and analysis of our products to achieve additional LEED credits, and help further the cause of building sustainable and efficient buildings.

Warranty information available upon request.

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Phone: 303.972.5107, 800.688.8677

americanfibercement.com

For the nearest authorized fabricator, call 303.972.5107.

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American Fiber Cement (AFC) warrants that its products are manufactured in accordance with its applicable material specifications and are free from defects in materials and workmanship using AFC's specifications as a standard. Only products which are installed and used in accordance with applicable AFC instructions and specifications are in any way warranted by AFC. This warranty is applicable only to claims made in writing and received by AFC within thirty (30) days after the defect was discovered and within ten (10) years after the date of the shipment of the product by AFC. All other claims are waived. If a claim is made, you must allow reasonable investigation of the product you claim is defective and you must supply samples that adequately demonstrate the problem you claim for testing by AFC.

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This limited warranty is your sole and exclusive remedy. It is expressly understood and agreed that the limit of liability will be, at AFC's option, repair, resupply of a like quantity of non-defective product, or refund of purchase price of the material. All labor and service charges which may be incurred with respect to either the original or replacement product are excluded. AFC shall have no liability except where the claim results solely from breach of AFC's limited warranty.

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