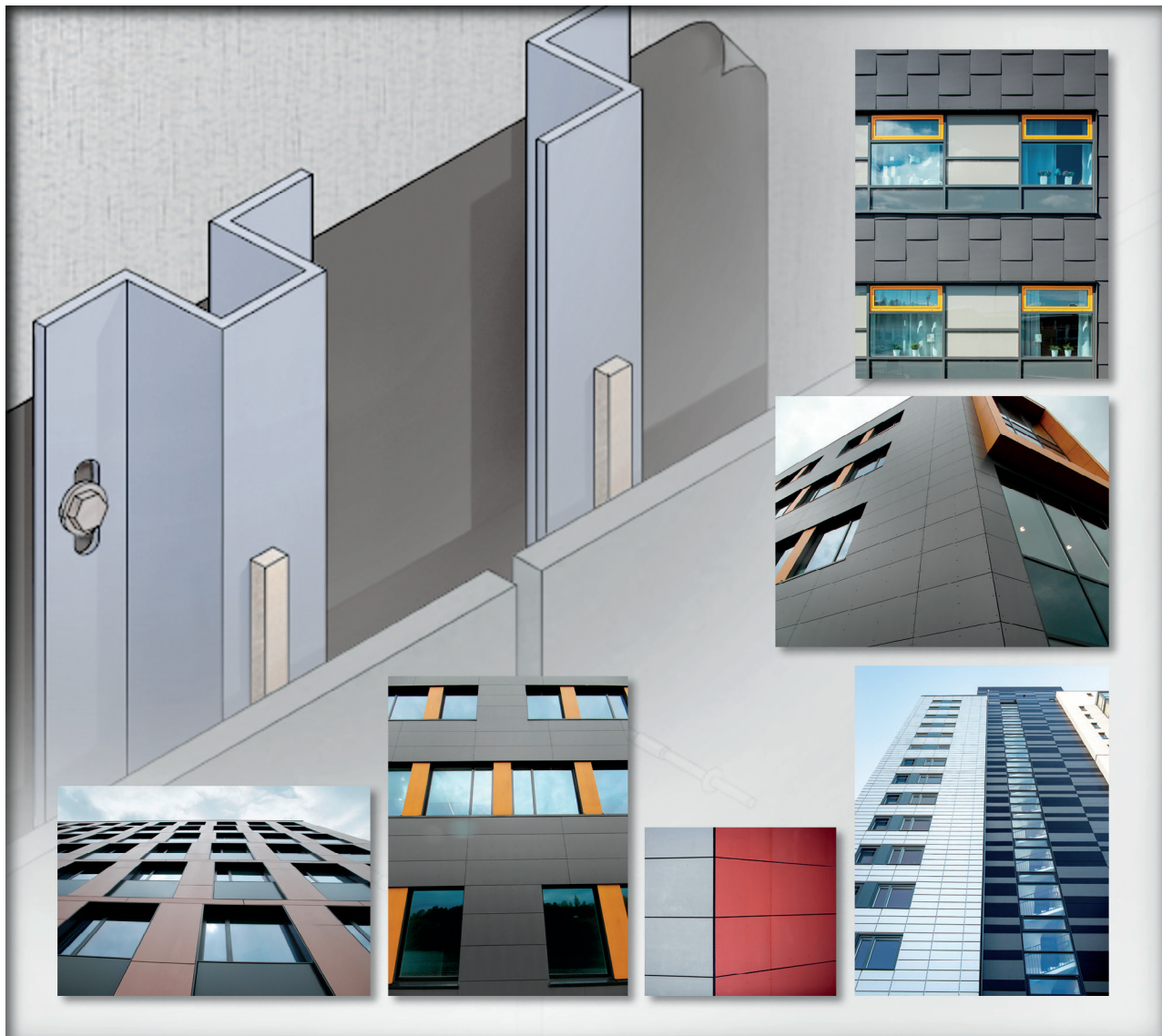


Standard Installation Guidelines¹

Aluminum Profiles with Rivets

Rain Screen Application — 8 mm Panels

For **ASHRAE 90.1 Continuous Insulation**,
see **R-TEC CI SYSTEM** Guidelines

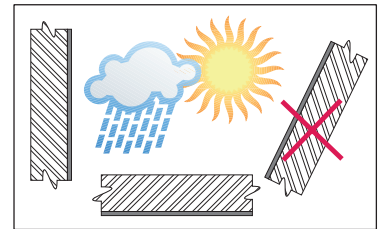


¹ These guidelines represent an **abbreviated illustration** for proper installation of Cembonit, Zenit, True and Metro architectural panels in a ventilated rain screen application. Additional guidelines and procedures can be found in an accompanying instruction brochure: Cladding Installation – Application Instructions. Special Instructions are necessary for buildings over 150 ft high, or for buildings in high wind areas. Check with your AFC Cladding representative.

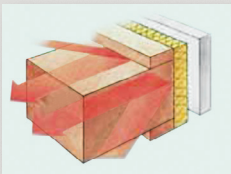
Construction Practices

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. For walls over 60 feet high, the ventilated cavity between rear of panels and exterior wall should be increased to 30 mm ($1\frac{1}{4}$ "). Air flow behind the cement fiber panels is a critical necessity in rain screen constructions.
2. A perforated insect/vermin screen can be affixed at joint openings. Care must be taken to assure the screens' geometry does not restrict air flow at the top or bottom of the wall section.
3. Install panels from top of building to bottom.
4. For straight walls, start panel installation in center and work outward.
5. For walls with inside corners, start installation there and work across wall.
6. Jobsite storage:
 - Keep material under cover, dry and protected with a waterproof tarp.
 - Transport material on edge.
 - Brush off any material dust generated by drilling or cutting prior to installation. This prevents the panel from discoloration due to abrasion or chemical reaction.
 - Do not use the shipping crates or pallets containing the fiber cement panels as a work surface. Keep panels dust-free.
7. For field cuts and drilling, use carbide or diamond blades/bits and slower turning/feed rates.

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

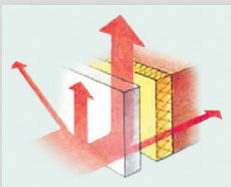


Rain Screen Cladding



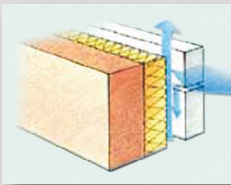
Preventing thermal bridges

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.



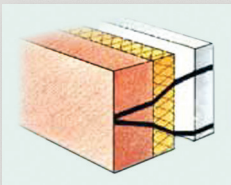
Dissipating heat from the sun

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.



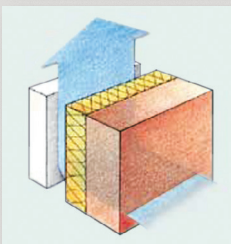
Rainscreen

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.

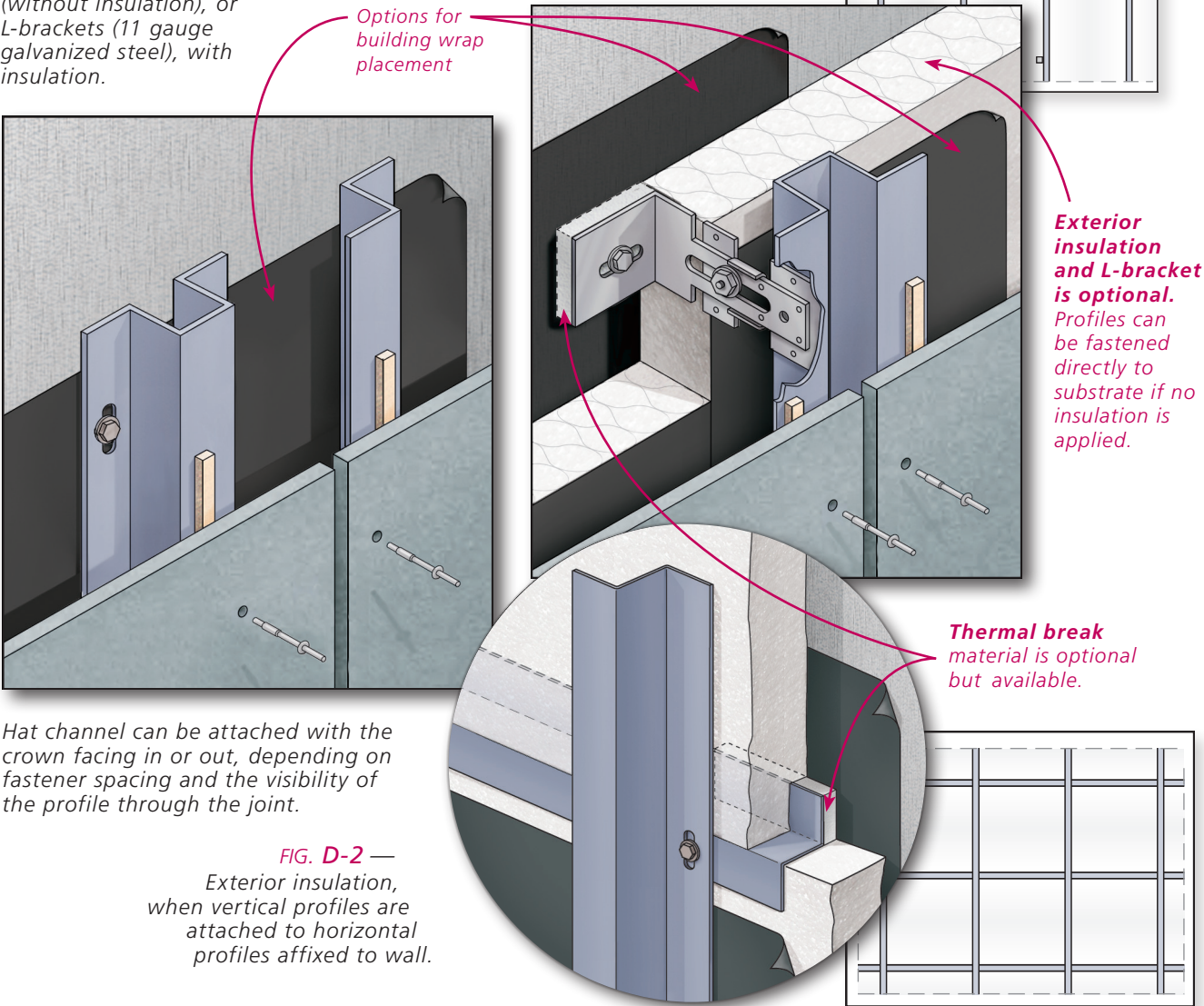


Prevention of internal condensation

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 vapour 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.

Profile Attachment — illustrated

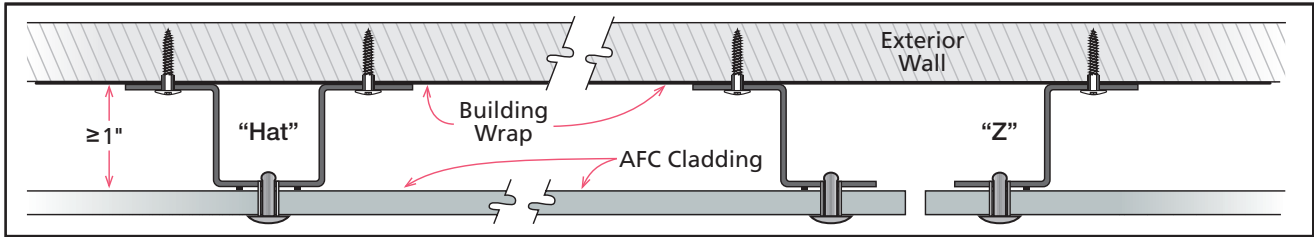
FIG. D-1 — Vertical profiles are attached using “Hat” or “Z” channel (without insulation), or L-brackets (11 gauge galvanized steel), with insulation.



Hat channel can be attached with the crown facing in or out, depending on fastener spacing and the visibility of the profile through the joint.

FIG. D-2 — Exterior insulation, when vertical profiles are attached to horizontal profiles affixed to wall.

FIG. J — “Hat” or “Z” channels and vertical joint.



Can be affixed vertically directly to wall if there is no exterior insulation.

FIG. H — Astro rivet with fixed cylinder

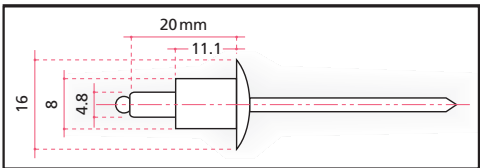
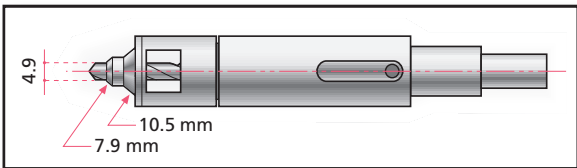


FIG. I — Centralizing drill bit

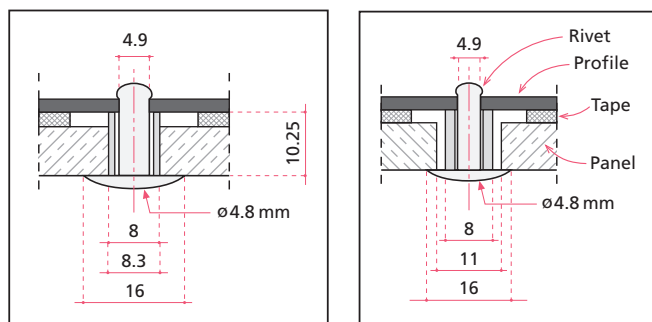


For centering pilot hole in profile for **Fixed Points** (7.9 mm) and **Gliding Points** (10.5 mm)

Building/Structure

1. **Architect/Engineer/Contractor to design and build structurally sound, water-tight exterior wall. Special care should be given to building location, building height, and maximum actual wind loads.**
2. **Attach profiles to exterior walls. Structural engineer to determine fastening/affixing specification,** i.e. quantity and type of attachment and fasteners, based upon exterior wall construction. Attachment must support 3.2 lbs/ft² (8 mm panel) dead load plus design wind loads. Fasteners in profile must accommodate thermal expansion/contraction of metal and not interfere with panel application. It is recommended to have one fixed point attachment at **center of the profile** with the rest of the attachments being gliding points to accommodate movement. Be consistent with the fixed point location on adjacent profiles so they are at the same level horizontally. This reduces stress in the panels.
3. Profiles for affixing panels to be a minimum thickness of 2 mm or greater, determined by building orientation/location and load factors.
4. Profiles for affixing panels need to provide a 25 mm–30 mm (1" – 1¼") airspace (between back of panel and the exterior wall), the greater being for buildings over 60 feet high, up to a maximum height of 150 feet. For buildings over 150 feet high, special provisions are required; check with your AFC Cladding representative.
5. Profile width at vertical joints to be ≥ 120 mm (4¾") as illustrated, and interior center profile width to be ≥ 40 mm (1½") or greater, to allow tolerances in alignment. Maximum length of aluminum profile ≤ 10 feet. Two narrower profiles (as illustrated, "Hat" or "Z" $\geq 1½$ " — FIG. D-1) may be used in place of one wide profile at vertical joints. Panel can be cantilevered over edge profile so vertical joint is open.
6. Profiles to be straight, plumb, level and aligned correctly on the building. **For installations without exterior insulation, the aluminum profiles are typically affixed directly to the exterior wall.** (See FIG. J)
7. **It is recommended to take field measurements before panels are cut or drilled.** Field measurements verify print dimensions to ensure proper fit.
8. Spacing between vertical profiles to be ≥ 20 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 panels).
9. For structures with **exterior insulation**, follow the insulation manufacturer's installation instructions. Either adjustable L-brackets or horizontal metal profiles (the same depth as the exterior insulation) can be attached to the exterior wall (FIG. D-1). Vertical metal profiles are then attached to either the L-bracket or the horizontal profiles. (FIG. D-2).

FIG. E — Fixed and Gliding Points



Fixed Point — cylinder & rivet

Gliding Point — cylinder & rivet

FIG. A

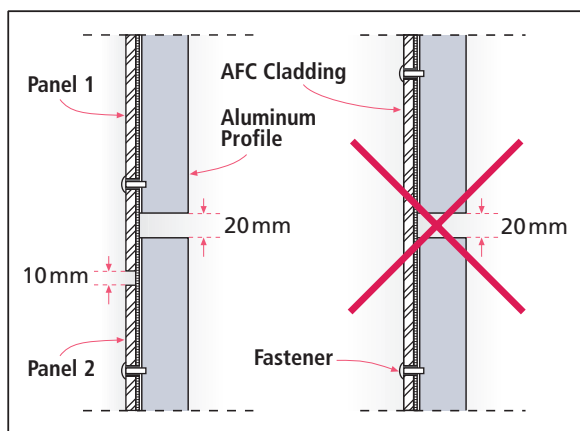


FIG. B —

Interior profile.
Affix adhesive foam tape to either **or** both sides of rivet

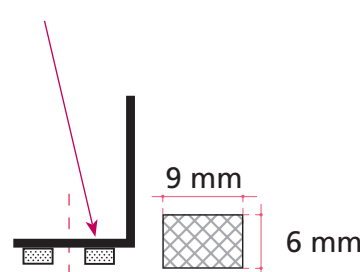
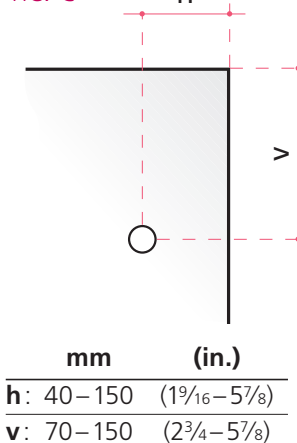


FIG. C

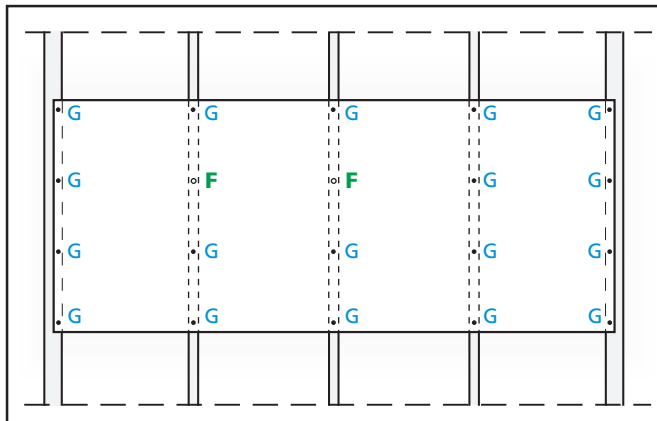


Prepare Profile

1. Typical vertical and horizontal joints are left open and have a black background (use a black building wrap). Metal profiles visible at joint openings (vertical and horizontal) can be covered with a black UV weather resistant tape or UV weather resistant coating. Other reveal colors are possible if desired.
2. Affix adhesive foam tape to the profile's full length — 1 or 2 strips on interior profiles to either side of rivet location. For vertical joint (panel edge) profile, one strip is used to the panel's center side of rivet location. (See FIG. B)
3. Horizontal and vertical joints can be closed with aluminum profiles (21 gauge or less) if desired.

Panels

1. Panels to be Cembonit, Zenit, Metro or True.
2. 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)
3. Pre-drill holes in panel so that there are:
(See FIGS. E, F & G)
 - Two (2) **fixed points** per panel (**F**).
 - The rest of the holes are to be **gliding points** (**G**).
 - See **Fixing** section (and FIGS. F & G) for determining location of fixed points in each panel.
4. Diameter of the fixed point hole is to be 8.3 mm ($\frac{21}{64}$ ").
5. Diameter of the gliding point hole is to be 11 mm ($\frac{7}{16}$ ").
6. Joints between profiles must coincide with joints in the panels. **Panels cannot bridge a break in the profiles.** (See FIG. A)
7. Cembonit 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.
8. **The pilot hole in metal profile** must be in the center of either the fixed point hole or gliding point hole. Use a drill bit centralizing fixture to accomplish this geometry. Pilot hole to be 4.9 mm in diameter — use #10 drill bit (4.9149 mm). (See FIG. I)
9. After first affixing the two fixed-point rivets, work from the top of the panel to the bottom to avoid damage to the panels.



Fixing

1. Rivets to be Astro Rivet with colored or stainless steel head with 8 mm x 11.1 mm cylinder. Shank of rivet is 4.8 mm x 20 mm long, with a 16 mm diameter head. (See FIG. H)
2. Fixing pattern is typically either 16" or 24" on center horizontally (based upon metal 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.
3. Corner rivets to be located at 40 – 150 mm horizontally and 70 – 150 mm down/up vertically from each corner of panel. (FIG. D)
4. 10 mm ($\frac{3}{8}$ ") clearance is required from the edge of metal profile to pilot hole for rivet.
5. Two **fixed points** are required per panel. (FIGS. I & J)

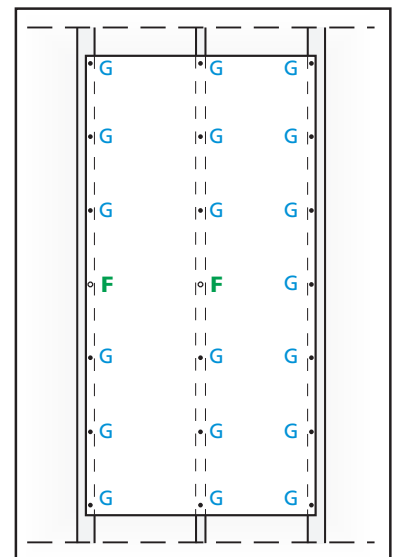
Fixed points (for attachment to vertical profiles) are:

- 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 attachment to horizontal metal profiles, check with the AFC Cladding Representative

► FIG. F — Vertical installation on vertical profiles

▼ FIG. G — Horizontal installation on vertical profiles

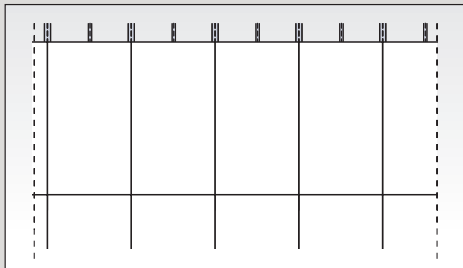


Fixing (continued)

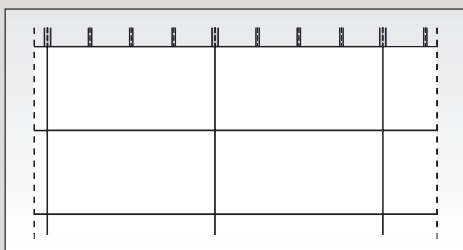
- For smaller panel sizes with only two rows of fasteners, fixed points to be top center and top left **or** top right (horizontal applications on vertical profiles). For vertical narrow panel applications on vertical profiles, vertical joints must incorporate two separate profiles (as illustrated, **FIGS. D-1 & J**).
 - For attachment to horizontal profiles, check with the AFC Cladding Representative. A two-layer attachment is required and the fixed point/gliding point parameters are different.
- Aluminum joint closures and decorative corner profiles are available if required (maximum thickness of finishing profile to be .8mm or 21 gauge). Standard practice is to normally leave joints open.
 - Pilot hole for rivet in metal profile to be 4.9mm diameter. See **Panel** section for drill size. (See **FIGS. E & I**)
 - Remove drill shavings from metal profile holes and panel fixed and gliding holes prior to installing rivets. Prior to installation, brush off any dust on panel due to drilling residue.

Typical Pattern Layout

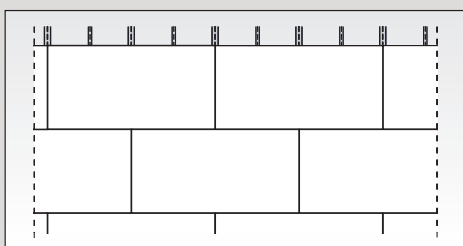
Panels can be used full size (4' x 8' or 4' x 10'), or fabricated to smaller dimensions.



Straight pattern with vertical panels



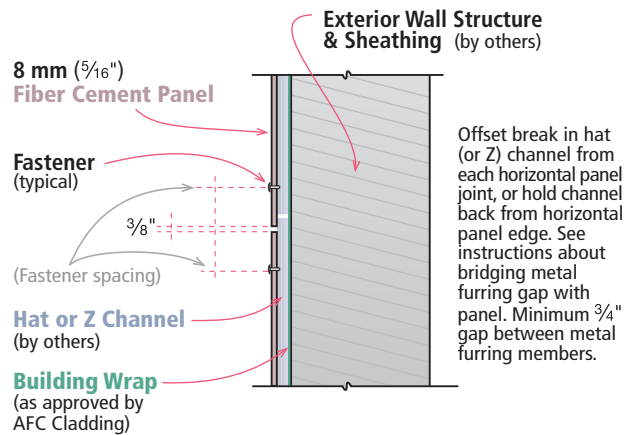
Straight pattern with horizontal panels



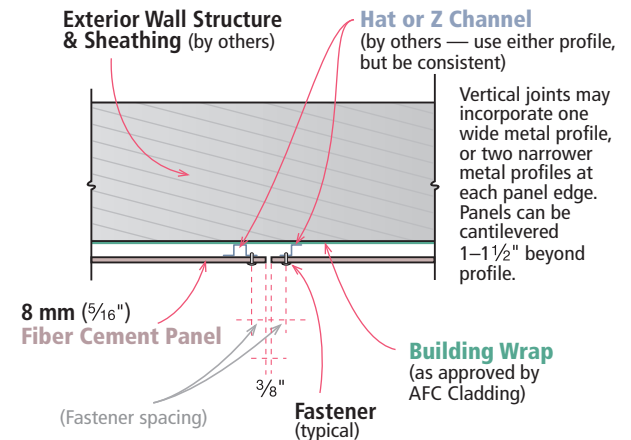
Semi pattern with horizontal panels

Details

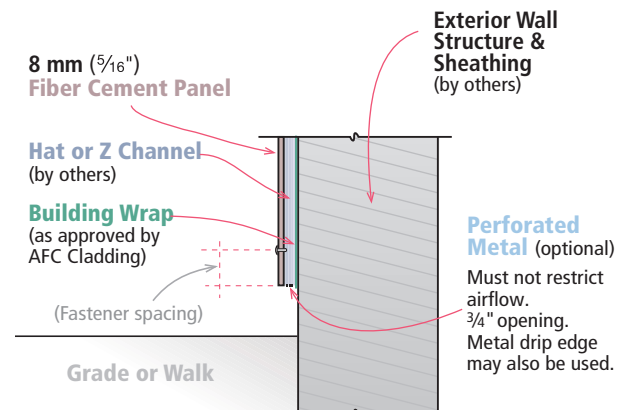
Typical Horizontal Panel Joint



Typical Vertical Panel Joint



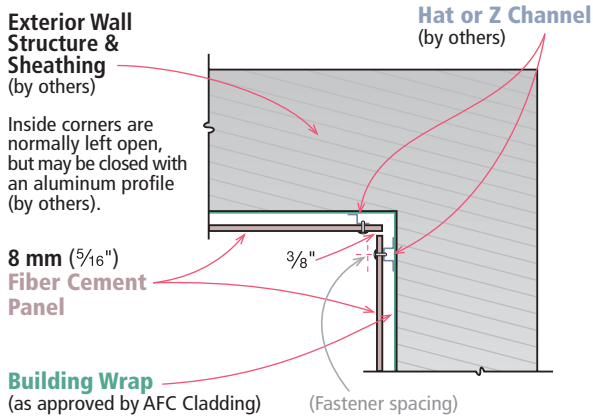
Typical Panel Base



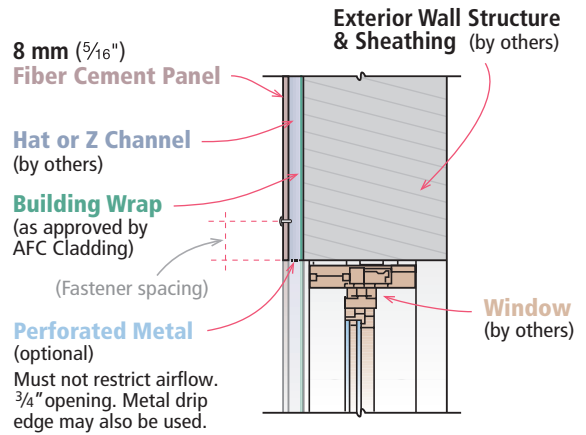
Ventilated Rain Screen Application

Details (continued)

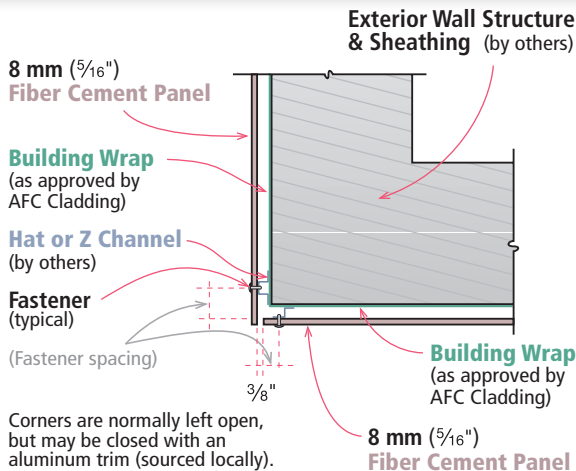
Typical Inside Corner – Plan View



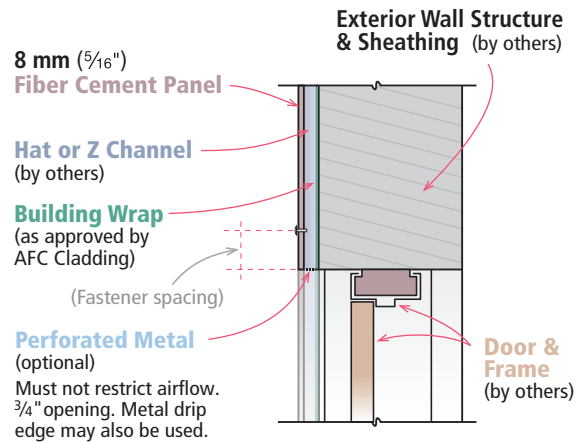
Typical Panel @ Window Head



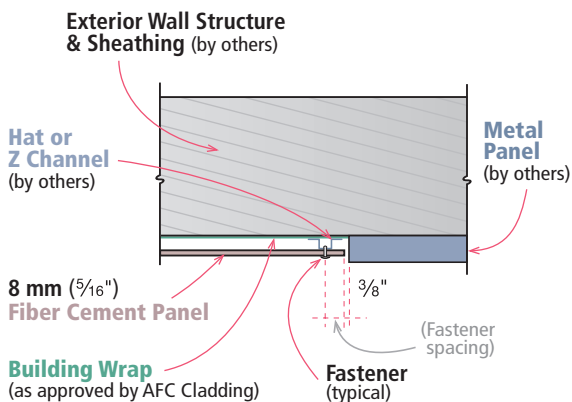
Typical Outside Corner – Plan View



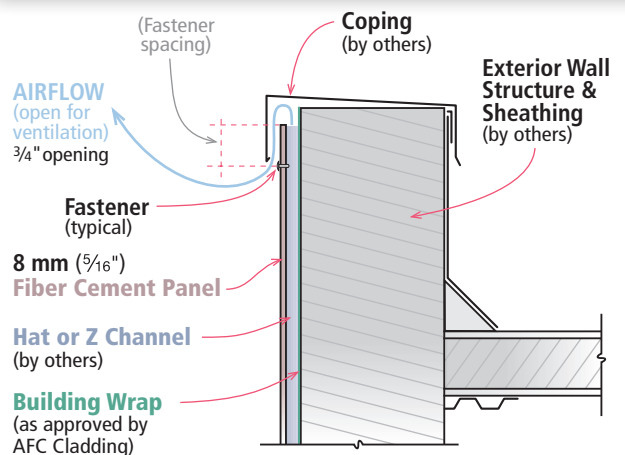
Typical Panel @ Door Head



Typical Panel End @ Metal Panel



Typical Panel @ Parapet



Product Sustainability Statement

AFC Cladding is committed to providing the finest high density compressed fiber cement panels to the U.S., Canadian and Mexican 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.

AFC Cladding products currently have a potential contribution in seven (7) areas¹ of LEED credits across multiple LEED rating systems, and have several sustainability attributes in addition to those recognized by LEED rating systems.¹ One of the most important sustainable attributes is the durability of AFC Cladding panels. With their long lifespan, virtually requiring no refurbishment, AFC Cladding panels can contribute to less replacement of materials and to drastically lower maintenance costs over the useful life of the building.

The recommended Ventilated and Insulated Rain Screen Cladding (VIRSC) system, which

is used to affix AFC Cladding panels to the exterior of a structure, offers many benefits and green attributes to the performance of the building envelope. Durability, resistance to moisture, and resistance to mold build-up are the most notable, followed by its ability to easily accommodate external insulation, which addresses the issues of thermal bridging.¹ These attributes are just a few of the many areas where innovative design approaches can improve the indoor environmental qualities and have a potential contribution to LEED credits.

In addition, AFC Cladding 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.

¹ YRG Sustainability —

American Fiber Cement Corporation —
Green Product Assessment

Limited Warranty

American Fiber Cement Corporation (AFCC) warrants that its products are manufactured in accordance with its applicable material specifications and are free from defects in materials and workmanship using AFCC's specifications as a standard. Only products which are installed and used in accordance with applicable AFCC instructions and specifications are in any way warranted by AFCC. This warranty is applicable only to claims made in writing and received by AFCC within thirty (30) days after the defect was discovered and within ten (10) years after the date of the shipment of the product by AFCC. 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 AFCC.

AFCC DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. THIS LIMITED WARRANTY PROVIDES YOUR EXCLUSIVE REMEDY AS A PURCHASER OF AFCC PRODUCTS. THIS LIMITED WARRANTY MAY BE MODIFIED OR AMENDED ONLY BY A WRITTEN INSTRUMENT SIGNED BY A DULY AUTHORIZED REPRESENTATIVE OF AFCC. WITHOUT AN EXPRESS, WRITTEN AUTHORIZATION FROM AFCC, NO RETAILER OR DISTRIBUTOR OF AFCC PRODUCTS HAS THE AUTHORITY TO MODIFY OR AMEND THIS LIMITED WARRANTY.

Limitation of Liability

This limited warranty is your sole and exclusive remedy. It is expressly understood and agreed that the limit of liability will be, at AFCC'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. AFCC shall have no liability except where the claim results solely from breach of AFCC's limited warranty.

AFCC SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES. FURTHERMORE, AFCC SHALL NOT BE LIABLE FOR DAMAGE TO THE PROPERTY TO WHICH THE PRODUCT IS APPLIED OR ITS CONTENTS, LOSS OF TIME, PROFITS, OR ANY INCONVENIENCE ARISING OUT OF ANY BREACH OF THIS LIMITED WARRANTY OR OBLIGATIONS UNDER THIS LIMITED WARRANTY. AFCC SHALL NOT BE LIABLE FOR ANY DAMAGES WHICH ARE BASED UPON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY EXCEPT THE LIMITED WARRANTY SET FORTH ABOVE. INCIDENTAL AND CONSEQUENTIAL DAMAGES SHALL NOT BE RECOVERABLE EVEN IF THE REPLACEMENT REMEDY FAILS OF ITS PURPOSE OR FOR ANY OTHER REASON.

Distributed exclusively by:



**American Fiber
Cement Corporation**

6901 South Pierce Street
Suite 260
Littleton, CO 80128 U.S.A.
Phone: 303-978-1199
800-688-8677
Fax: 303-978-0308
www.americanfibercement.com

For the authorized fabricator nearest
to you, call 1-800-688-8677