

StoVentec® Fiber Cement

Application Guidelines

January 2025

Facade



Ventilated rainscreen cladding systems

StoVentec® Fiber Cement Rainscreen® Systems combine timeless, designer aesthetics with advanced energy efficiency, creating a superior building envelope solution. This fully engineered, multi-layered system integrates an air and water-resistive barrier, a robust sub-construction made from aluminum or steel brackets and profiles, mineral wool thermal insulation board, and durable high-density fiber cement. The fiber cement panels can be custom-fabricated into various shapes, offering unparalleled design versatility. Ideal for both modern and traditional architecture, StoVentec® ensures long-lasting performance, durability, and adaptability to any design vision.



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Version 1.0 - January 1, 2025 - Please note that the details, illustrations, general technical information, and drawings contained in this brochure are only general proposals and details which merely describe the basic functions schematically. They are not dimensionally accurate. The applicator/customer is independently responsible for determining the suitability and completeness for the construction project in question. Neighbouring works are described only schematically. All specifications and information must be adjusted or agreed in the light of local conditions and do not constitute work, detail, or installation plans. The technical specifications and product information included in the Technical Data Sheets and system descriptions/approvals must be observed.

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Phone: 800-221-2397

stocorp.com/rainscreen



StoVentec® Fiber Cement (SVFC) Rainscreen cladding facade

Overview of Product and System Credentials



ASTM C1186 Type A, Grade IV compliant

[Intertek Listing Spec ID 79917](#)



Noncombustible, in accordance with ASTM E136/2652

[Intertek Listing Spec ID 79917](#)



General U.S. Code Compliance plus Florida, California, and Los Angeles Codes

[Intertek Code Compliance Research Report](#)

Certification for physical properties, weather resistance, wind resistance, surface burning characteristics, noncombustibility, and fire propagation. Suitable for Construction Types I-V



Hurricane Rated

[Florida Product Approval # w/ HVHZ](#)

Design Pressure rating (max.): +/- 115 psf

Hurricane cycle testing TAS 202-203
Impact resistance deemed via concrete backup wall or 5/8" plywood sheathing over 16" o.c. 18 ga steel framing

System description

Applications	<ul style="list-style-type: none"> • New and existing buildings • Commercial, Residential, Institutional, Educational, or Mixed Use, etc. • Thick system build-ups (up to 14-9/16" (371 mm)) are possible
Substrates	<ul style="list-style-type: none"> • Masonry, such as brick, CMU, and masonry veneer • Concrete, concrete slab construction • Lumber frame construction • Steel light-frame construction
Fixing	<ul style="list-style-type: none"> • Easily adjustable sub-construction made of a combination of galvanized steel and/or aluminum brackets and rails • Visible fasteners: rivets or self-drilling screws • Concealed anchors with horizontal sub-construction rails
Thermal protection	<ul style="list-style-type: none"> • Mineral wool with nonwoven fabric facing • High insulant thicknesses possible (up to 13.5" (343mm)) • System implementation also possible without insulation
Reaction to fire	<ul style="list-style-type: none"> • Noncombustible per ASTM E136/2652 • ASTM E84 Class A: 0 flame spread, 0 smoke • Suitable for Construction Types I-IV • Fire breaks/barriers may be required in accordance with local code
Fiber-cement properties	<ul style="list-style-type: none"> • ASTM C1186 Type A • Grade IV Flexural Strength • ASTM E330 ultimate wind load capacity: 196 lb/ft² • Florida TAS 202-203 max. wind design pressure rating: 115 lb/ft²
Design options	<ul style="list-style-type: none"> • Standard dimensions 4x8 or 4x10 feet (1220 x 2440 or 3050mm) • Horizontal or vertical layouts • Custom dimensions and shapes via fabrication • Visible or concealed fastening
Color range	<ul style="list-style-type: none"> • Opaque surface paint on grey body or pigmented body panels • 14 standard colors • No limitation to the light reflectance value
Approvals	<ul style="list-style-type: none"> • Intertek Code Compliance Research Report • Florida Product Approval

General application and planning information

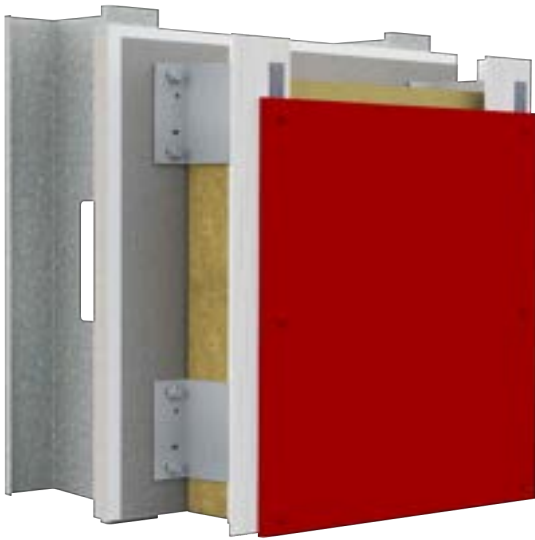
- The applicable system certifications or evaluations are the basis for the planning and execution of facade and/or ceiling cladding with **StoVentec® Fiber Cement**.
- For any project, always comply with local building code and/or registered design professional for structural adequacy requirements for exterior walls. With StoVentec Fiber Cement, ensure a wall deflection limit of L/240.
- The StoVentec sub-construction and fiber-cement panels can be dimensioned and fastened in accordance with prescriptive configurations provided in the Intertek CCRR and to meet an allowable system design pressure of up to 115 psf. The details of these prescriptions are included throughout this guide and noted accordingly. Otherwise, project-specific wind criteria may be met with customized engineering (project-based structural analysis) of the sub-construction (bracket spacing, anchoring, etc). With project-specific engineering of the system, follow the details provided in the engineered shop drawings.
- For retrofits over existing substrates such as masonry, field analysis and engineering is necessary to ensure the substrate can provide adequate dead load support and fastener withdrawal capacity for anchors securing StoVentec.
- Possible markings (i.e. thermal ghosting) on the vertical sub-construction result from building physics, can occur with all ventilated claddings, and are not product-specific. These markings do not constitute a fault.
- Increased exposure to splash water and long-term moisture penetration of the system can lead to efflorescences in the panels and should be prevented with structural and/or maintenance measures.
- Structural expansion/control/movement joints must be incorporated into the system.
- In the case of planned applications that are not included or described in the application guidelines, the technical feasibility for the specific project must be determined with Sto Corp. in advance. Please contact the rainscreen Technical Solutions department at Sto Corp.
- Before getting started, refer to the [StoVentec® Rainscreen Systems Toolkit](#) for a detailed listing of the necessary tools needed to install StoVentec and SVFC.



System build-ups

Limited combustibility, in accordance with NFPA 285

According to ASTM E136/E2652 and Jensen Hughes Project No. 1JJB05184.001



1 — Wall Assembly

5/8" thick, Type X interior gypsum board (not shown) and 18 gauge steel studs spaced 16" o.c. with 20 gauge top and bottom tracks and min. 1/2" exterior glass mat sheathing, (optional cavity insulation) -or- cast-in-place or CMU block wall

2 — Air and Water Resistive Barrier

Sto Flexyl (wet film thickness 1.6 mm), Stoguard VaporSeal R (wet film thickness 0.38 mm (15 mils)), Sto Gold Coat (wet film thickness 0.25 mm (10 mils), or Sto Air Seal (wet film thickness 1.3 to 1.8 mm (50-70 mils))

3 — Sub-construction

Sub-construction that is thermal bridge-optimised made of Zn-Al-Mg galvanized or stainless steel or aluminum wall brackets and aluminium or steel L and T-Profiles to fix the fiber-cement. Horizontal spacing of L/T-Profiles: 16" (406 mm) o.c.

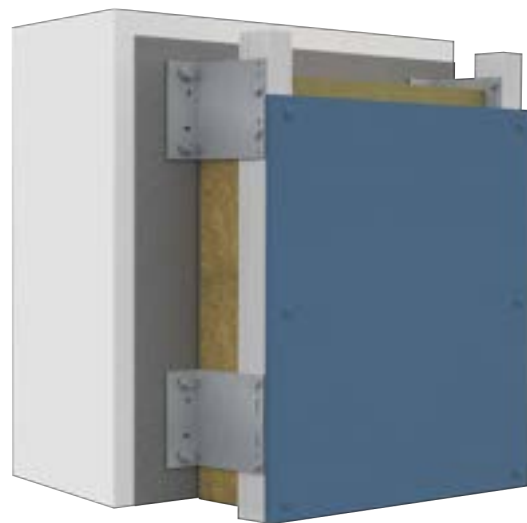
4 — Exterior Insulation

Mineral wool complying with ASTM C612 and ASTM E136 with density minimum 4.0 lb/ft³. Thickness shall be no less than 2 in. (50 mm). The air gap between insulation and back of fiber-cement may be between 10 and 60 mm.

5 — Fiber-cement: StoVentec F.C. (ASTM E2652 non-combustible)

Fiber-cement made of sand, portland cement, and cellulose fibers; dimensions: 5/16" (8 mm) thick, 4 ft (1220 mm) x 8 ft (2440 mm); weight 3.2 lb/ft² (15.7 kg/m²);
Flame Spread Index per ASTM E84: 0 (Class A)

Limited combustibility, in accordance with CAN/ULC S-134



1 — Wall Assembly

Construct a wall assembly that shall comply with the local Building Code or other applicable regulatory requirements as established by the local Authority Having Jurisdiction.

2 — Air and Water Resistive Barrier

Sto Flexyl (wet film thickness 1.6 mm), Stoguard VaporSeal R (wet film thickness 0.38 mm (15 mils)), Sto Gold Coat (wet film thickness 0.25 mm (10 mils))

3 — Sub-construction

Sub-construction that is thermal bridge-optimised made of Zn-Al-Mg galvanized or stainless steel or aluminum wall brackets and aluminium or steel L and T-Profiles to fix the fiber-cement. Horizontal spacing of L/T-Profiles: 16" (406mm) o.c.

4 — Exterior Insulation

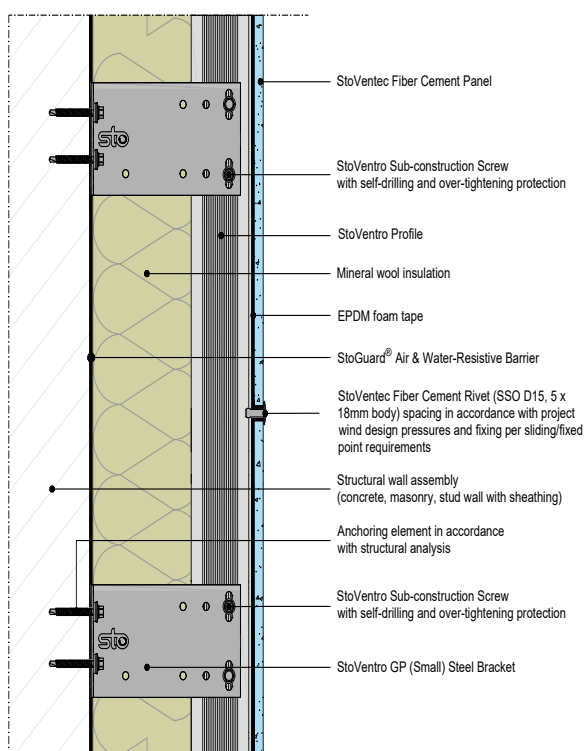
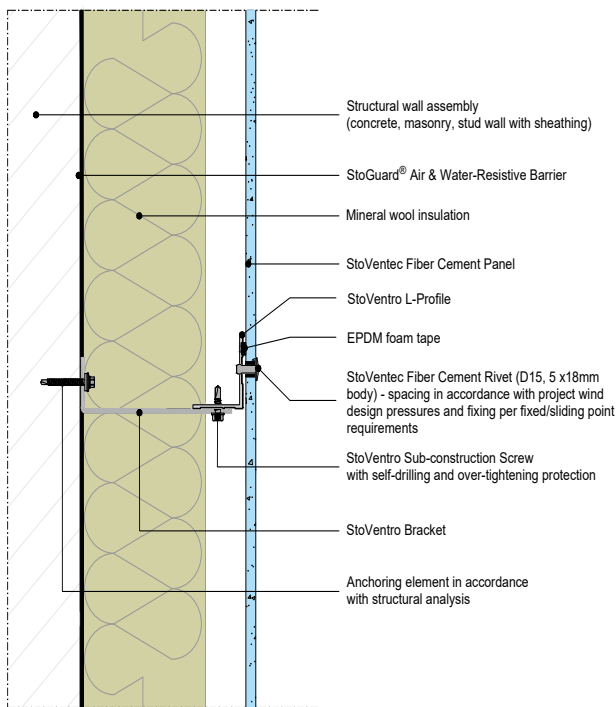
Mineral wool complying with ASTM C612 and CAN/ULC-S114 with density range from 3.5 lb/ft³ to 6.0 lb/ft³ (72 kg/m³ to 96.72 kg/m³). Thickness shall be no less than 2 in. (50mm). The air gap between insulation and back of fiber-cement may be between 10 and 60 mm.

5 — Fiber-cement: StoVentec F.C. (ASTM E2652/ISO 1182 non-combustible)

Fiber-cement made of sand, portland cement, and cellulose fibers; dimensions: 5/16" (8 mm) thick, 4 ft (1220 mm) x 8 ft (2440 mm); weight 3.2 lb/ft² (15.7 kg/m²);
Flame Spread Index per ASTM E84: 0 (Class A)

System sections

Installation requirements



- If the structural wall substrate is load-bearing and able to bear the load of the StoVentec Fiber Cement (total system weight (sub-construction, insulation, and fiber-cement panel) is variable but maxes out near 7 lb/ft²), the system can be properly installed based on a project-specific wind load calculation as well as pre-engineered prescriptions or project-specific structural verification. The system is ideal for problematic substrates. It can even compensate for large unevenness in the anchorage substrate.
- Doors, windows, roller shutter boxes, parapets, horizontal covers and window sills must be installed before the facade cladding. Ensure that parapets, horizontal covers, and window sills have a large enough projection when planning the system build-up.
- Determine the building shell tolerances (field/as built measurements) and specify the required wall bracket projections/depths more precisely than in initial planning.
- As part of the working drawings and before installation of the StoVentec Fiber Cement, the applicator must specify and coordinate, as needed, the application of the sub-construction and the required formation of details and system connections, based on the system certifications and pre-engineered prescriptive approach, or project-based structural analyses and taking into account project-specific conditions.

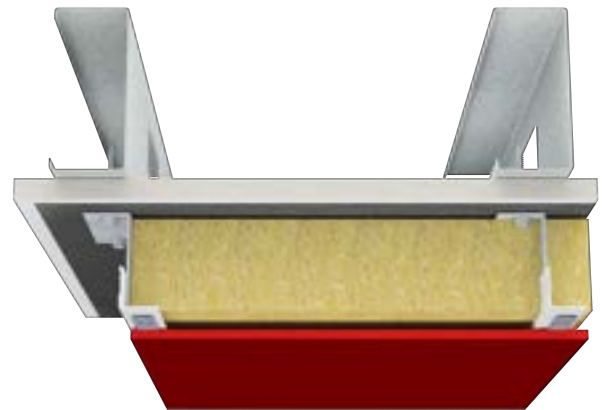
Note

Additional system and detail drawings, installation videos, technical hotlines, and more are available at <https://www.stocorp.com/rainscreen/>.



Backup wall types & sheathing

- StoVentec F.C. is suitable for wood or metal framed walls, CMU block, or precast/tiltup concrete
- New construction or retrofits
- For any project, always comply with local building code and/or registered design professional for structural adequacy requirements for exterior walls. With StoVentec Fiber Cement, ensure a wall deflection limit of $L/240$ and a lateral deflection limit for wind of $h/500$
- Framed walls must utilize stud spacing at a maximum of 24 inches (605 mm) o.c.
- Metal framing minimum 18 gauge, 33 ksi
- For studded walls, exterior sheathing is required as a substrate for StoGuard air and water-resistive barriers
 - exterior glass mat gypsum
 - plywood
 - OSB
 - cement board
- Interior sheathing and/or lateral stud bracing/bridging may be required to control base wall deflection
- Refer to the fastening diagrams and [Intertek CCRR](#) for prescriptive SVFC assembly wind load testing



Note

Additional system and product bulletins as well as Technical Hotlines are available at www.stocorp.com/rainscreen-systems/.

Air and water-resistive barriers

- StoVentec F.C. is a drained/back-ventilated rainscreen system
- For studded walls with sheathing, an air and water-resistive barrier layer is required
- For concrete and masonry walls, follow local code
- The StoGuard family of air and water-resistive barriers (AWRB) provides multiple options, however Sto AirSeal, possessing high elongation and UV durability properties, is well-suited for StoVentec rainscreen system applications due to its optimization for high build installations. The following StoGuard products and respective application thicknesses are suitable:
 - Sto Air Seal® (wet film thickness 1.3 to 1.8 mm (50-70 mils)), or
 - Sto Gold Coat® (wet film thickness 0.25 mm (10 mils))
 - Sto Flexyl (wet film thickness 1.6 mm), or
 - Sto VaporSeal® (Class 1 vapor retarder) (wet film thickness 0.38 mm (15 mils))
- Refer to the respective StoGuard AWRB product bulletins and specifications for more details and application instructions/requirements



[Sto AirSeal®](#)



[Sto Gold Coat®](#)



[Sto VaporSeal®](#)

Note

Additional information on StoGuard air and water-resistive barriers is available at www.stocorp.com/air-water-resistive-barriers/.



StoVentec® Fiber Cement (SVFC)

StoVentec® Fiber Cement is a high-density, non-combustible ASTM C1186 Type A, Grade IV compliant fiber-cement cladding. Refer to the Product and System Bulletins, Design Guide and Detail Booklet, code reports, specifications, Safety Data Sheet, and this complete Application Guide available at stocorp.com/rainscreen-systems.

The fiber-cement panels are completely pre-finished. As such they must be handled with care and kept clean in order to preserve the finish aesthetics. Use of professional CNC equipment for fiber-cement fabrication in a controlled indoor setting is highly recommended. Panel processing activities in the field at job sites should be kept to a minimum. StoVentec has a network of partners and can facilitate a full package of engineering and fabrication services.

Fiber Cement Pallet Transport, Handling and Storage

Pallets of fiber-cement must be transported under cover, protected from the weather. Panels are packaged in crates on pallets with plastic overwrap and foam slip sheets between and surrounding the panels. The factory packaging is not sufficient to protect the materials from weather.

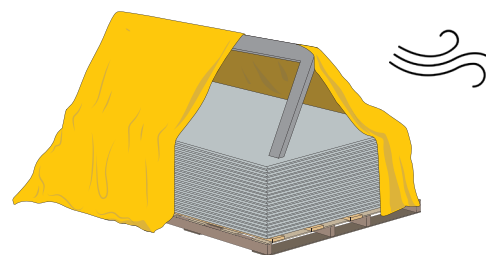
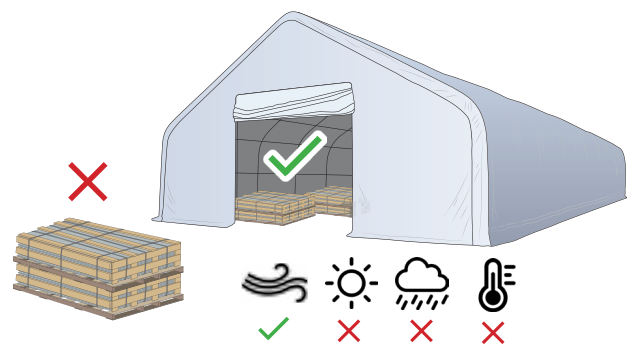
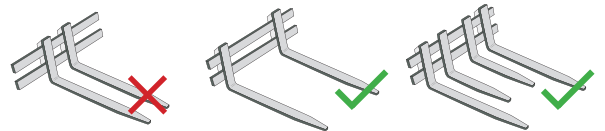
Unloading must be carried out with suitable machinery and tools. Belts, spacers, and forks of any forklifts must be suitably equipped to ensure weight is evenly distributed. Always handle or move pallets individually, one at a time.

Store on pallets in the original shipping crates, protected from weather and sunlight, in an **indoors/dry location** on flat surfaces until ready for installation. During prolonged indoor storage, remove the pallet plastic overwrap to allow for ventilation. Pallets of like size may be stacked two (2) high.

During the installation process at the job site, when pallets are not in use, cover with a vapor permeable cover. Always prevent the panels from coming in direct contact with the ground.



Move pallets with care to distribute weight evenly. Only move one pallet at a time.



Silica Dust & OSHA Standard for Construction

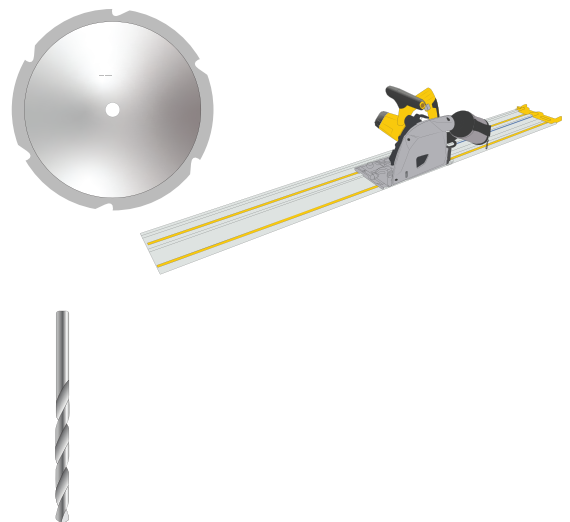
Fiber cement contains silica (sand) and, like with any construction material that does, caution must be taken to protect users and any individuals in the vicinity from exposure to respirable crystalline silica dust, which is a serious health hazard covered by extensive [OSHA rules](#) for the construction industry.

Dust mitigation measures, collection, and/or use of personal protective equipment (PPE) are necessary whenever fiber cement is cut, drilled, or sanded. Wherever possible, utilize vacuum dust collection with HEPA filtration while cutting, sanding, or drilling fiber cement. Utilize safety glasses and N95 dust masks whenever fabricating panels by hand.



Hand Tools and Professional CNC Equipment

If cutting fiber cement by hand, **panel saws** or **track saws** utilizing **fiber cement saw blades** are recommended so that no part of the saw but the cutting blade contacts the fiber cement as it is cut. Diamond tipped saw blades designed for cutting fiber cement have fewer teeth than typical blades, reducing the amount of silica dust generated. A **jigsaw** with **carbide grit blades** can be used to create circular cuts or arched/non-linear cuts.

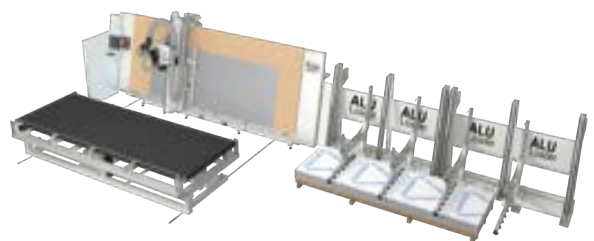


Concrete/masonry drill bits are needed to pre-drill fiber cement panels where fasteners will be located at installation.

- 7/16 inch (11mm) bits for StoVentec Fiber Cement Screw applications
- 13/32 inch (10mm) bits for StoVentec Fiber Cement Rivet applications

Sandpaper/Block: 60-100 grit

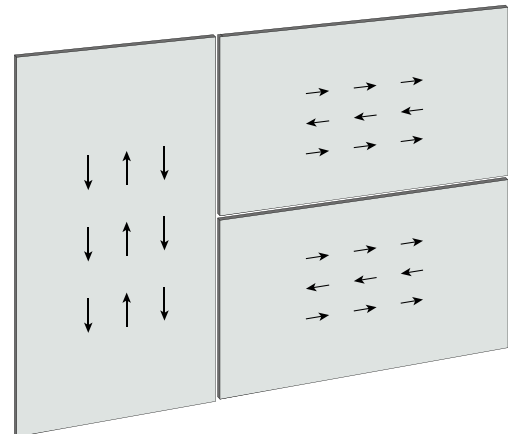
Professional CNC Equipment in a controlled indoor setting is the absolute best means of preparing pre-finished fiber cement for installation. Best practices and optimal tools for fabricating fiber cement vary according to the particular equipment with programming and guidance for various material types provided by the machine manufacturers. Such machines can move panels, cut them to final dimensions, drill fastener holes and/or perforations, and chamfer edges all while controlling dust and minimizing direct human interaction with the materials. **StoVentec can facilitate professional fabrication services for any project.**





Panel Directionality

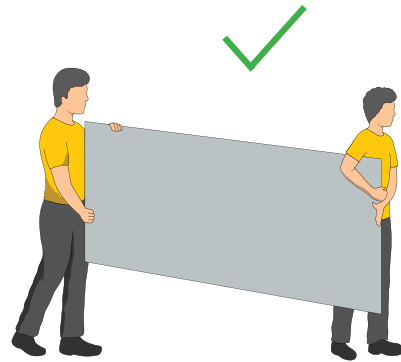
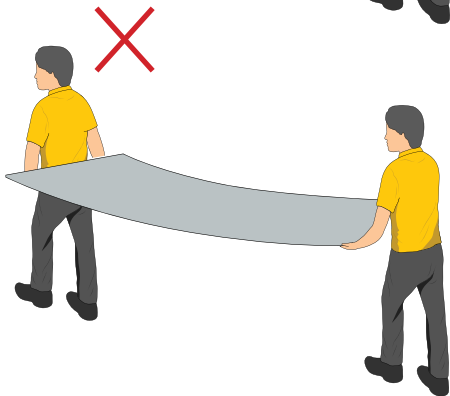
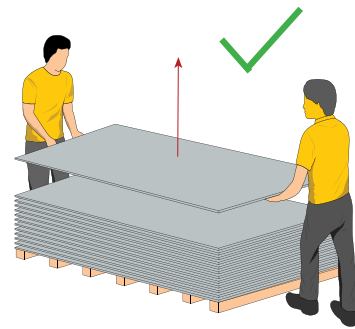
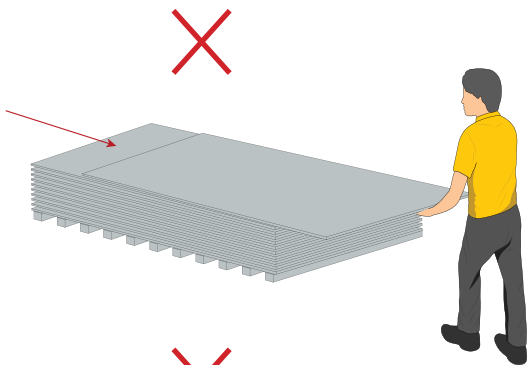
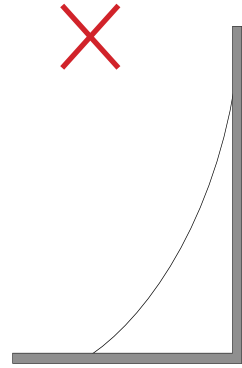
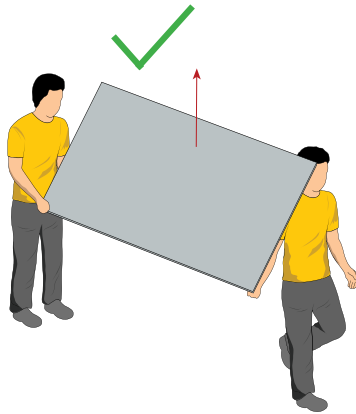
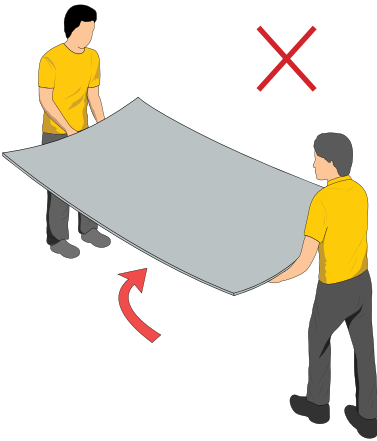
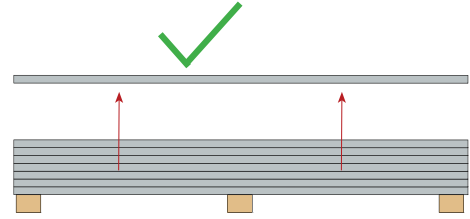
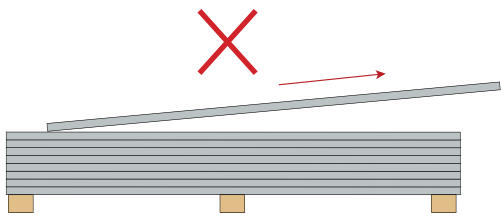
StoVentec Fiber Cement panels have a physical and an aesthetic directionality in their visible finish surfaces. During production, the fibers become oriented parallel to the long dimension. Further, Primara Line panels have a light sanding grain texture running in the long direction of the panels. Similarly, Strata Line panels, although completely smooth, have a subtle uniform linear effect in the finish paint. As such, it is important to plan for this physical and visual directionality in the panel layout and in cutting panels accordingly.



Individual Panel Handling

Panels are completely pre-finished. As such they must be handled with care and kept clean in order to preserve the finish aesthetics.

- Working in teams, lift panels directly up off their stack
- Dragging panels off the stack will cause finish damage
- Carry panels on edge by a minimum of two people
- Do not rest panels against a wall such that they can bow
- Do not mark, draw on, or chalk the finished surface of panels





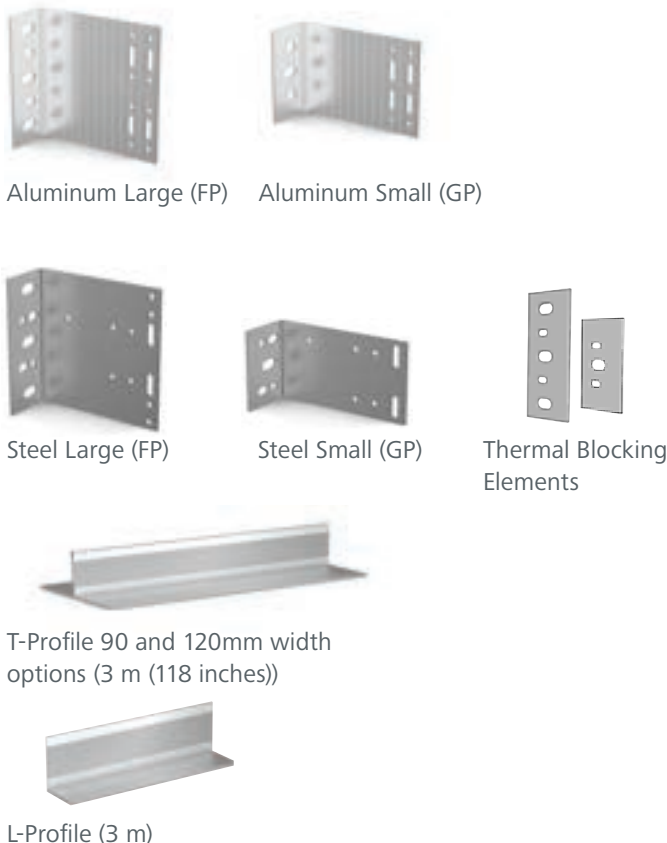
StoVentro basics and planning

Brackets and L/T-Profiles

StoVentro sub-construction is an adjustable, thermally-broken bracket and rail system compatible with many types of cladding. Brackets are made with aluminum or Zn-Al-Mg-galvanized steel and are sized by 20 mm increments from 40 to 360 mm in depth. Steel brackets are available with or without spring fingers (also known as retainers) that assist with L/T-Profile installation by temporarily supporting them until fastening occurs.

Large - fixed point (FP) - brackets transfer dead loads and wind loads to the primary structure while Small - sliding/ gliding point (GP) - brackets only aid with wind loads. The fasteners connecting L/T-Profiles to Small (GP) brackets are positioned within oblong pre-punched holes in the brackets. This allows for the thermal expansion/contraction of the aluminum L/T-Profiles. L-Profiles are also used with fiber cement to reinforce panels at corner joints.

Thermal blocking elements are optional accessories to further minimize the thermal bridging effect. Detailed thermal analyses of the StoVentro system are available in the Document Center at stocorp.com.

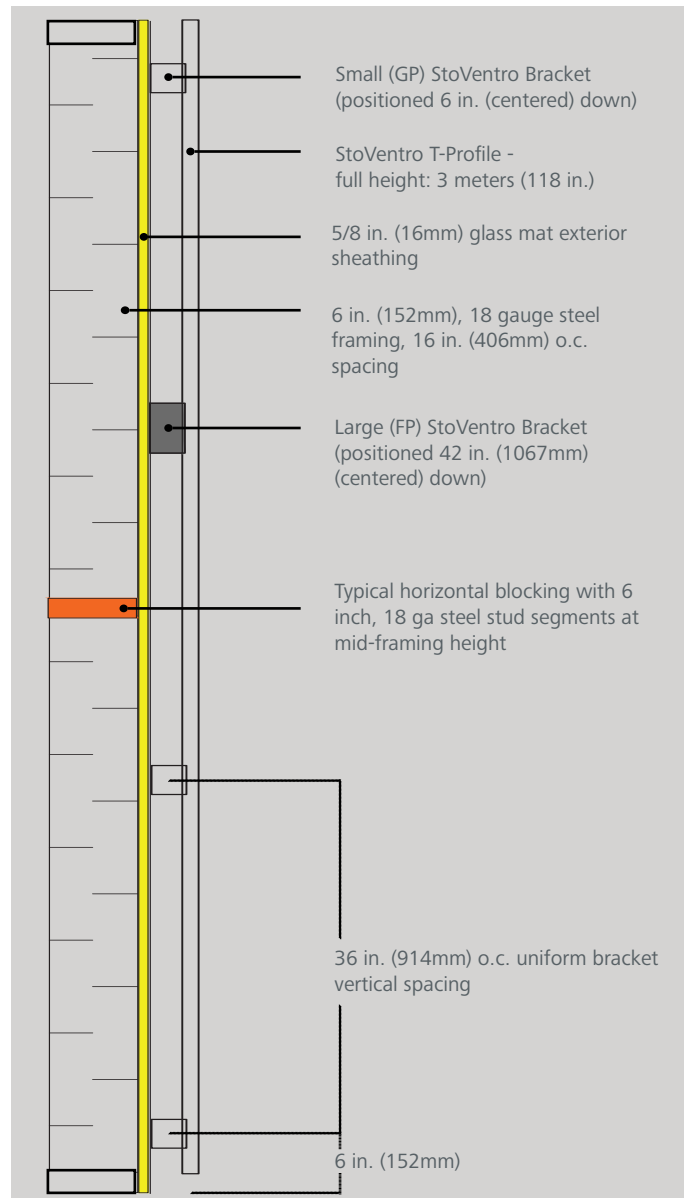


Bracket and L/T-Profile configurations

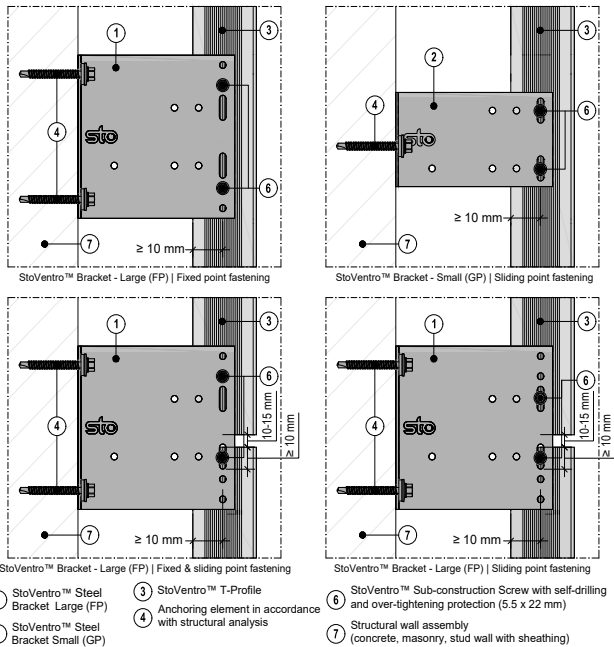
Full height Profiles are 3 meters (118 inches) long. Each profile typically is secured by one Large (FP) bracket and at least two Small (GP) brackets. For StoVentec Fiber Cement, the horizontal spacing of brackets and L/T-Profiles must be 16 inches (406 mm) or 24 inches (610mm) o.c. maximum.

Vertical spacing of brackets varies by project based on wind design pressures. A project-based structural analyses can determine alternative vertical bracket spacings permitted specifically for a particular building.

Sto's prescriptive StoVentro configuration (illustration below) utilizes four brackets on full-height L/T-profiles spaced 16" o.c. Brackets are spaced at a maximum of 36 inches (914mm) apart vertically. This configuration is rated +/- 190 psf (9.1 kN/m²) - ultimate wind load:



Brackets and Profiles - possible fixed point and sliding point arrangements



System requirements:

- Position the fixed point in the middle of the L/T-Profile or at a maximum of 59 inches (1.5 m) from the profile end
- Cantilevered L/T-Profile ends may not exceed 12 in. (305 mm), depending on the wind design pressure:
 - 12 in. (305 mm): -190 psf ultimate pressure or less
- Large (FP) brackets may also serve as sliding point brackets or a combination of both fixed and sliding at Profile joints
- Large (FP) brackets can be positioned at Profile joints
 - leave 15 mm (~5/8") gap between Profiles

The diagrams show a selection of possible arrangements, depending on the building geometry, structural requirements, anchorage substrates and system projections. Apart from the prescriptive StoVentro design, the StoVentro configuration to be used is determined by project-specific structural analyses.

Tips

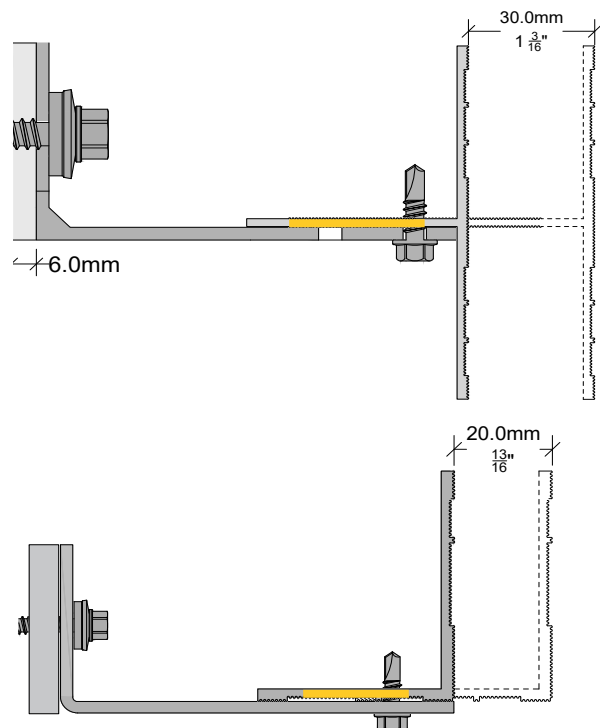
For each facade surface, align the first and last Profiles to be perpendicular and install on the wall brackets. Next, install a horizontal reference line to align the remaining profiles. Alternatively, use a laser.

Set the Profiles, starting from the outside corners and moving toward the center of the facade. When using wall brackets with retainers, it is possible to insert all Profiles before applying the reference line.

L/T-Profiles and f.c. panel layouts

For fiber cement, 120mm StoVentro T-Profiles are needed where vertical joints occur between panels. Otherwise, L-Profiles are typical everywhere else within the field of a panel and at terminations. Therefore, the ratio of T to L Profiles and their arrangement depends on the panel layout. Stacked layouts (aligned vertical joints) require the fewest T's, while a horizontal staggered/running bond arrangement necessitates more and the ratio varies depending on the stagger. For example, with a whole 4x8 panel oriented horizontally with a 16 inch vertical joint stagger, two T's are needed for every four L's. For a 32 inch stagger, five T's are needed for every 12 L's. Refer to the panel fastening/layout illustrations beginning on page 28 as well as the Fiber Cement Design Guide.

System adjustability



The default fastening position through a T-Profile is in the center of the fastening flange. T-Profiles feature a 30mm wide fastening zone, textured lightly with shallow grooves. To ensure level and plumb for the Fiber Cement surface, the T-Profiles can be fastened +/- 5/8 in. (15 mm) from the center of the lightly gooved fastening area. Note: Thermal blocking element featured above with 6 mm (1/4 in.) thickness.

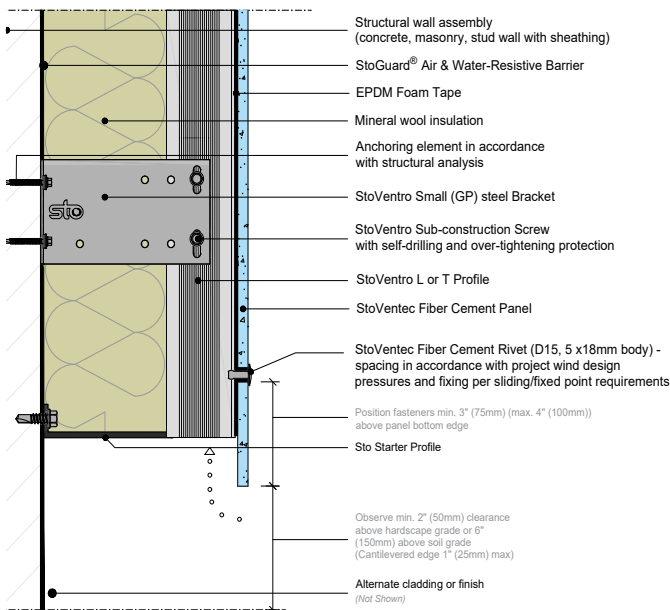
L-Profiles have a 20mm adjustment range when fastened to the bracket through the 40mm (1-9/16") leg (typical/standard), or 30mm if oriented with the 50mm (1-15/16") leg fastened to the bracket.



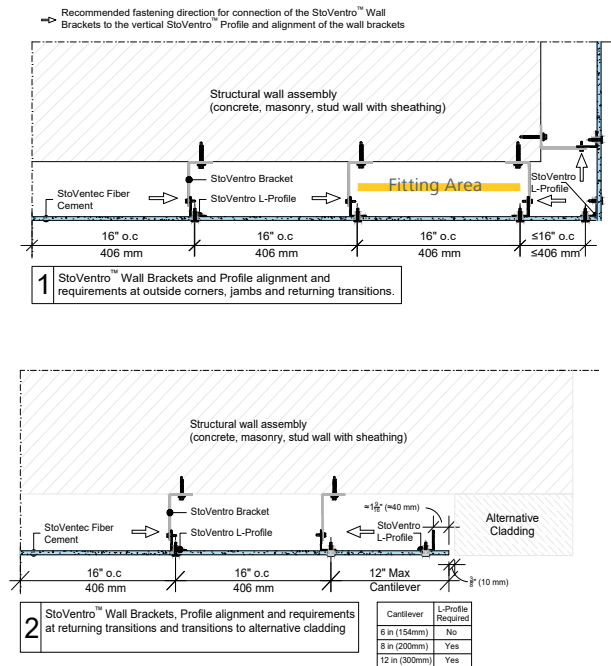
Getting Started

Sub-construction/insulation

Measuring the facade – 1) Determining the base point



Measuring the facade – 2) Marking the Profile centerlines



1) There are multiple bottom-edge detail options. Refer to the **Installation at Grade** section in this guide as well as detail 90.Fc.055 and .065.

- 2) The base point of the facade above ground level or roof surfaces is to be determined in such a way that
- the system ventilation is guaranteed over the long term and
 - the facade cladding is not constantly soaked by spray/splash water from neighbouring horizontal surfaces
 - minimum clearance above grade: 6 inches (150 mm)
 - Fiber cement may cantilever below the Profiles with the lowest course of f.c. fasteners at least 3 inches (75 mm) above the bottom edge of the panels

1) Refer to the **Outside Corners** portion of this guide.

2) Fitting area: where the distance between the brackets/rails nearest the building corner and the next/second line is likely to be less than 16" (406mm).

3) Observe the building shell (surface plane) tolerances in order to let the f.c. panels protrude enough to meet evenly at the outside corners. Cantilevers up to 16 inches (406 mm) are possible depending on project wind load requirements and use of L-Profiles to reinforce the panel joint.

4) The arrows in the illustrations above indicate the recommended alignment/orientation of the StoVentec Brackets and direction of fastening for connecting the Profiles. StoVentec screws always pass through the bracket holes before penetrating the Profile.

Tip

Refer to the [StoVentec® Rainscreen Systems Toolkit](#) for a comprehensive list of tools and items needed for StoVentec and Render installation.

Measuring the facade - 2) Marking the L/T-Profile centerlines:

Mark the wall substrate for the vertical L/T-Profile centerlines at a regular interval of 16-24 inches on center (406-610 mm).

- Mark the L/T-Profile centerlines beginning at an outside corner.
- Position the L/T-Profile centerlines at the outside corners as required to anchor the brackets into stud framing, or, for concrete, CMU, and masonry applications, position per edge distance requirements - typical 4 in. (102 mm) fastener edge distance - or per a project-specific structural analysis/fastening schedule
- After the outside corner bracket/rail line, mark the second and third Profile centerlines on the bare wall. The distance from the outside corner bracket/rail centerline to the second profile centerline is to be less than or equal to 16 in. (406 mm), as this is the fitting area. The third line should then be 16 in. (24" (610mm) max) from the second.
- The applicable building shell (surface plane) tolerances must be noted and taken into account in the fiber cement panel projection at the outside corners of the facade. The maximum panel cantilever is 16" (406 mm) and L-Profiles must be used to reinforce all the corner joints. Refer to the cantilever table (page 16) as well as [Detail 90.Fc.049](#).
- Establish the existing building shell tolerances for the entire facade surface at the marked profile centerlines using a reference line or laser to define the required wall bracket projections/depths more precisely.
- Additional L/T-Profile centerlines are needed for window and other system connections as well as inside corners. Each panel must be fastened to at least two L/T Profiles.

Notes

We generally recommend marking the L/T-Profile axes and not the anchor/bracket axes on the anchorage substrate.

The wind loads applicable to the facade area must be determined according to local building code.



Sub-construction brackets

Measuring the facade – 3) Arranging the wall brackets



1 Determine the number, vertical spacing, and arrangement of the wall brackets as Large (FP) and Small (GP) in accordance with pre-engineering prescriptions or a project-based structural analyses. Vertical spacings should be in 1/2 in. (12 mm) increments. Typical spacings are 24, 30, 36, 42, or 48 inches



2 Snap horizontal chalk lines to represent the midline axis of the brackets at the required vertical spacing. Utilize only alike bracket types/sizes along the same horizontal line (i.e. each row must be all Small brackets (GP) or all Large (FP) ones).



3 Observe an offset of approx. 20 mm (~3/4") from the L/T-Profile centerline/axis (already marked on the wall) to the centerline of the anchoring flange of the brackets. For concrete wall applications, it is recommended that the positions of subsequent drill holes for the wall fasteners/anchors are marked on the anchorage substrate with the help of the relevant wall bracket and spraypaint.

Tip

With horizontal spacing of L/T-Profiles every 16 inches (406 mm) o.c., mount the wall brackets so that the L/T-Profiles can be fastened to the wall brackets starting from the outside corner and moving toward the middle of the facade. The anchor flange of the wall bracket can be installed on the left or right of the L/T-Profile centerlines as needed.

Note

To reduce the thermal bridging effect, utilize the appropriate thermal blocking element between the brackets and wall surface.

Installing the wall brackets



1 To install the wall brackets, if needed, pre-drill the wall at the marked locations, depending on the wall structure and anchor types to be used and in accordance with the pre-engineering prescriptions or project specific anchor engineering. Observe the specified minimum drill hole depth. The drill holes must be cleaned appropriately.



2 Secure the wall brackets with appropriate anchors. The large (20 mm) oblong holes are for concrete anchors. The small circular and oblong holes are for stud wall anchors. Fasten so that lateral (left/right) shifting of the wall bracket is still possible because of the oblong holes (i.e. do not fully drive or tighten the anchors).



3 Align wall brackets in each column laterally. Tighten the anchor screws so that the full surface of the anchor collar/washer rests on the wall bracket and the screw head on the anchor collar/washer.

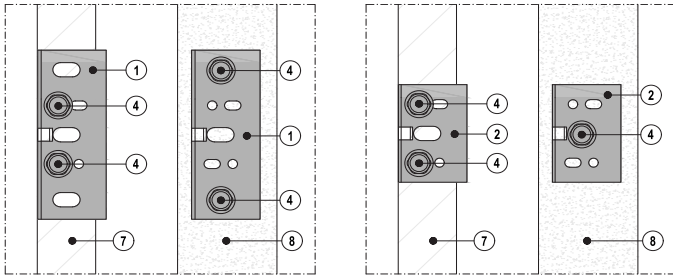


4 If not using stainless steel anchors, paint or level out galvanized screw heads at the connection to the anchor collar with a flexible, permanently elastic bitumen-oil combination coating.

Note

Use and install anchoring fasteners appropriate to the wall substrate and in accordance with Prescriptive requirements or a project-based anchoring design.

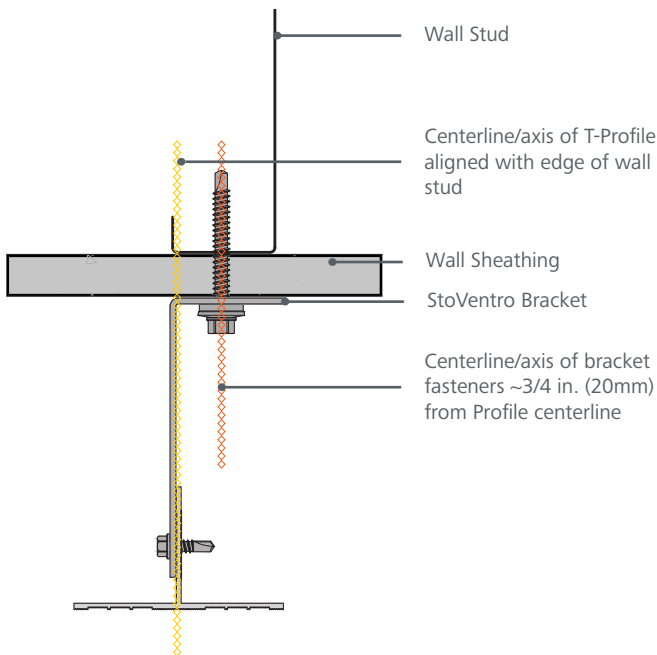
Anchoring arrangements



- ① Large (FP) steel bracket
- ② Small (GP) steel bracket
- ④ Wall anchor per structural analysis
- ⑦ Structural substrate (stud wall with sheathing)
- ⑧ Structural substrate (concrete and masonry)

The large 3/4 in. (20 mm) horizontal oblong holes are for concrete anchors. An FP bracket has three such pre-punched holes. GP brackets have only one concrete anchor hole each. The small circular and oblong holes are for stud wall anchors. The oblong holes allow for bracket alignment prior to full anchor tightening.

When applying brackets over stud framing, fasten the first screw in a small oblong hole and the second screw in a circular hole above or below in alignment with the first fastener (after alignment and initial tightening with the first anchor).



Wall bracket extensions

Wall bracket extensions are available to correct out-of-plane surfaces beyond the adjustability range provided by brackets alone.



For steel brackets and complimentary extensions, push the extension piece onto the wall bracket and align it to the desired depth.

For aluminum brackets, utilize clamps to temporarily hold the extension to the bracket at the desired depth.



Next, fix the extension on the wall bracket with two rivets (diameter: 5.0 mm, drill hole: 5.1 mm, clamping range: 2.5–4.5 mm).

Alternatively, screws may be utilized as designed by project-specific engineering.



Sub-construction L/T-Profiles and Insulation

Exterior insulation

Note

Sto Corp does not manufacture insulation but recommends Rockwool Cavityrock® and Cavityrock Black which are well-suited for rainscreen applications. Please refer to the [Rockwool Insulation Attachment Guide](#) for more complete information regarding compliance and installation.



Mineral Wool Properties:

- ASTM C612 (CAN/ULC S-702, Type I) compliant, non-combustible mineral fiber board classified into types IA, IB, IVA
- Minimum thickness: 2 inches (50 mm)*
- Density: 4.5 lb/ft³ (72.1 kg/m³)
- Thermal conductivity: 0.23 (BTU • in)/(hr. • ft² • °F), @ 75 °F (0.033 W/cm • K)
- Thermal resistance: R-Value = 4.3 per inch, RSI = 0.74 per 25 mm

Secure the mineral wool per manufacturer installation guidelines with appropriate fasteners or other means.

Notes

*If compliance with NFPA 285 or CAN/ULC S-134 is not required, the mineral wool may be less than 2 in. (50mm) thick.

Size StoVentro Brackets to pair with insulation that enables a minimum air space of 3/4 in. (20mm) and maximum 2 in. (50mm) between the surface of the insulation and the back of the L/T-Profiles and fiber cement panels. Refer to the [Fiber Cement Design Guide](#) for more detailed information.

Installing vertical L/T-Profiles on wall brackets without retainers (spring fingers) using grip pliers

If necessary, cut the L/T-Profiles to size using a chop saw, as needed for height constraints and/or in accordance with the installation plan.



When using StoVentro wall brackets without spring fingers, clamp the Profiles to the wall brackets with grip pliers until screw fastening is completed. Prior to fastening the Profiles, account for irregularities in the supporting wall construction and ensure the overall surfaces for the f.c. panels are level and plumb by aligning the Profiles with a reference line or laser.



Apply the insulation in sequence while installing the vertical Profiles. Working from left to right, with only the first column of Profiles clamped in place, insert the insulation panels, oriented vertically without gaps, friction fitting between the Profiles and second column of brackets.



Clamp the second column of Profiles into place and insert the insulation in the same manner as the first, and so on. Ensure the Profiles are level and plumb at the desired system depth and fasten with two StoVentro Screws - Self-Drilling (5.5 x 19 mm) at each bracket, appropriately utilizing the sliding and fixed points.

1. For fixed points, fasten the two screws in the outer round holes.

2. For sliding points, fasten the two screws centrally in the vertical oblong holes of the wall brackets. Refer to page 15.



3. Create joints between freely protruding Profile ends and/or on fixed/sliding or sliding/sliding points with a joint width of approx. 5/8 in. (15 mm) to allow for thermal expansion.

Avoid back ventilation of the insulation. The insulation must not be compressed. Using the original insulation material, stuff gaps in the insulation made during installation.

Alternative Procedure

Clamp/place, level, and fasten all the L/T-Profiles in the installation area in the same manner as above without placing insulation. To add insulation after the Profiles are secured, score the face of the insulation panels near their midpoint and then flex them into position between the brackets and Profiles. Avoid leaving space between the insulation panels and wall surface.

Tip

C-clamp locking pliers (11 in.) are the best option for temporarily securing T-Profiles to brackets.

Installing vertical L/T-Profiles on wall brackets with retainers (spring fingers)

The spring finger - L/T-Profile connection is temporary and fastening at each bracket is required.

Working from left to right, insert the Profiles into the retainers (spring fingers) of the first column of wall brackets. Insert the insulation panels, oriented vertically without gaps, friction fitting between the Profiles and second column of brackets.

Insert the second column of Profiles into place and place the insulation in the same manner as the first, and so on.

Prior to fastening the Profiles, ensure the overall surfaces for the f.c. panels are level and plumb. Align the profiles on a reference line or using a laser. Fasten the Profiles, as fixed and sliding points, with two StoVentro Screws - Self-Drilling (5.5 x 19 mm) for each bracket and using over-tightening protection.

1. For fixed points, fasten the two screws in the outer round holes.
2. For sliding points, fasten the two screws centrally in the vertical oblong holes of the wall brackets. Refer to page 15.
3. Create joints between freely protruding T-Profile ends and/or on fixed/sliding or sliding/sliding points with a joint width of approx. 5/8 in. (15 mm) to allow for thermal expansion.

Avoid back ventilation of the insulation. The insulation must not be compressed. Using the original insulation material, stuff gaps in the insulation made during installation.

Tip

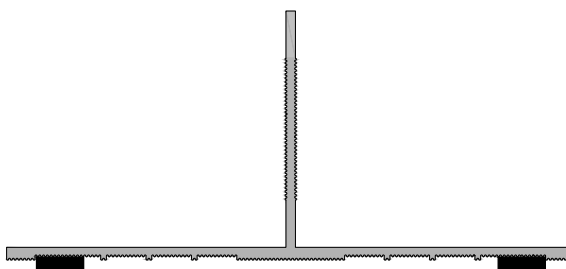
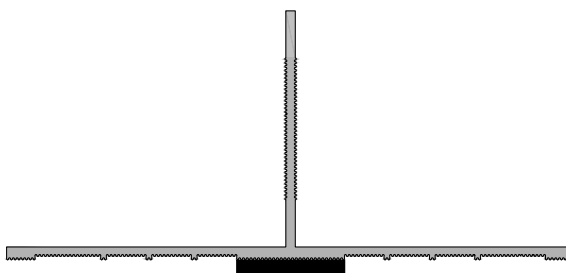
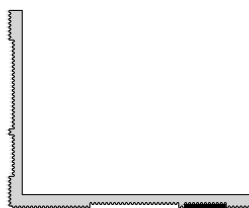
StoVentro Profiles are unpainted anodized aluminum. To reduce their visibility with open joint claddings, plan to apply black exterior spray paint at joint locations prior to installation of the fiber-cement panels.

EPDM Cushioning

Self-adhered EPDM foam tape or EPDM gaskets, serving as a cushioned spacer between fiber cement panels and metal profiles, are required. Adhere the EPDM to metal profiles prior to panel installation for visible fixing options of fiber cement.



Add continuous strips of the EPDM foam tape to the face of each L-Profile and T-Profile before beginning fiber-cement installation. Position foam tape to avoid fastening the panels through it:





Fiber cement panels

Product tips

StoVentec Fiber Cement

- Standard panel formats: 4 ft x 8 or 10 ft x 8mm (~5/16 in.) or 10mm (3/8 in.) (1220 x 2440 or 3050 x 8 or 10 mm)
- Weight: 8mm - 3.2 lb/ft² (15.7 kg/m²), 10mm - 4 lb/ft² (19.6 kg/m²)
- Class A Surface Burning Characteristics: flame spread index 0, smoke index 0
- ASTM E136/2652 non-combustible



StoVentec Fiber Cement visible fasteners:

Rivets (best option, Sto's recommended visible fastener) - SSO D15 x 5 x 18mm (stainless steel) with aluminum Fixed Point Sleeves



Alternative: Screws - 16mm pan head 5.5 x 25 mm (3/16 x 15/16 in.) (stainless steel) with fixed (grey) and sliding (black) point Centering Sleeves



StoVentec Fiber Cement concealed fastener:

[SFS TUF-S 6x9](#)



Cutting

Cutting panels face-down allows for the panel finish to remain clean/sharp at the cut edges. The worktop surfaces, which should include a sacrificial board, on which cutting and drilling occur must be flat, continuous (supporting the entire panel), and clean/soft/smooth so that panels are never subject to tension during cutting and finishes and edges/corners are not damaged. Foam slip sheets present between panels in their factory packaging may be used on the cutting table surface to help protect the panel finish.

Utilize lower saw blade rotation speed (2000-2500 rpm) with a feed speed of 10 feet per minute. The cutting angle should be perpendicular (90 degrees) to the panel surface.

Dust collection during the cutting process is necessary as fiber cement includes silica (sand), which is a health hazard with detailed [OSHA rules](#). Wherever possible, utilize a vacuum with HEPA filtration while cutting, sanding, or drilling fiber cement.

Cut edges may be sanded (grit 60-100) to remove any burrs. Angle the sanding block away from the panel finished surface. Again, remediate/remove any dust generated.

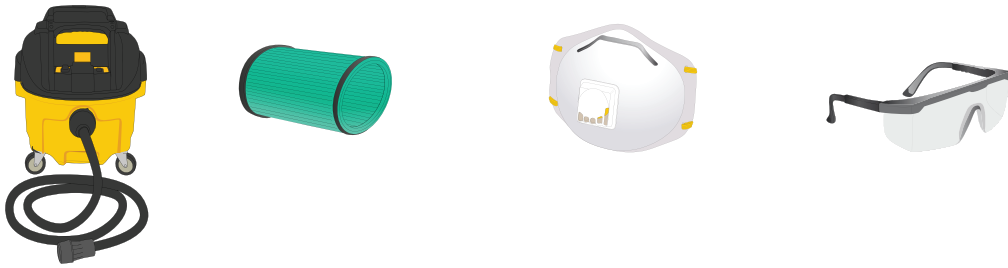
Drilling

Before high-density fiber cement can be installed, it must be pre-drilled to match a prescribed or engineered fastening pattern suitable for the design wind pressures of the project. Slow drilling speed is best as it will generate less fine dust. **Drill through the finish face of the panels.**

For installation with StoVentec F.C. Rivets, 13/32 inch (10mm) masonry bits are required. For projects utilizing StoVentec Fiber Cement Screws, panels must be pre-drilled with 7/16 inch (11mm) masonry bits.

Minimum fastener/hole to panel edge distances must also be observed. Refer to pages 25-31 as well as the **Design Guide and Detail Booklet** for the edge distances for pre-engineered wind load configurations or the project-specific engineering details/shop drawings.

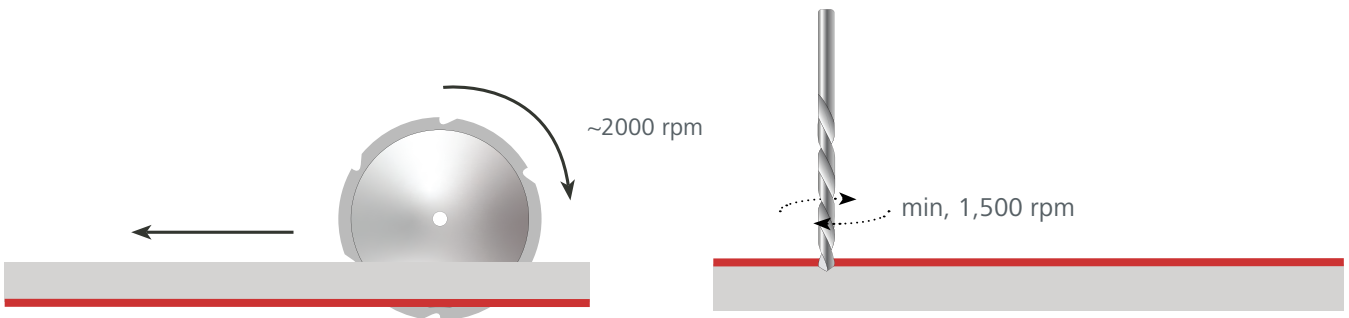
Always clean off any remnant materials on the rear surface of the holes as well as the drilled out material via vacuuming (w/ soft tip) and/or clean microfiber cloths.



Always utilize HEPA filtered dust collection and personal PPE when cutting, drilling, or sanding fiber cement.



For cutting panels in the field, a track saw or panel saw are appropriate.



Cut panels with the finish face DOWN.

Drill panels with the finish face UP.



Cut Edge Treatment

With panel cutting, sanding, and drilling completed (and dust fully and carefully removed), it is required to treat cut edges (including drilled holes) with a silane solution.

[Dowsil 520 water repellent](#) emulsion (concentrated and milky white) is used to treat cut edges of fiber-cement panels in order to hydrophobate the newly exposed edge surfaces. This provides long-term resistance to weather exposure in the field, replacing similar factory coating lost to cutting/drilling.

Dowsil 520 comes in 40% active material concentration and should be diluted to 10-15% using distilled or demineralized water. The 10% level is achieved with a 3:1 ratio of water to repellent. Apply to panel cut edges with a small roller, sponge-tipped applicator, or foam brush so that the surface remains moist for 3-4 minutes. Promptly wipe away any solution from the panel face. Utilize a cleanroom foam or cotton swab with small tip to treat pre-drilled holes in the panels.

In terms of volume and usage of applied, diluted solution, the rate should be minimum 200g/m² (5.9 ounces/yd²) with a maximum of 400g/m² (11.8 oz/yd²). Refer to Dow's technical data sheet for more information.

Cut Edge Re-coating

[StoColor Acryl Plus Flat](#) (80647), a high-performance, exterior grade, acrylic-based coating, color matched by Sto to the Primara Line and Strata Line collections or to custom colors, may be used for aesthetic re-coating of cut panel edges, particularly for products without integral (through-body) color. Apply Acryl Plus Flat in accordance with the [Product Bulletin](#) using a small roller or brush. Avoid getting the coating on the finish surface and remove any that does immediately with a clean cloth.

Finish Touch-up

Small scratches or blemishes may be touched up using color-matched StoColor Acryl Plus. Isolate the scratch with low-adhesive painter's tape. Utilizing the minimum amount of Acryl Plus possible to coat the scratch, and with a small, fine point artist's brush or cotton swab, touch up the blemish. Lightly dab to apply the color only to the blemish. Less is best: it is impossible to match the sheen of the factory finish with any touch up paint.



Technical Data Sheet

DOWSIL™ 520 Dilutable Water Repellent Emulsion

FEATURES & BENEFITS

- Easily diluted with water for ready use
- Produces a hydrophobic treatment that inhibits water absorption
- Excellent performance and stability at (5-20%) active ingredient levels
- Deep penetration of absorbent surfaces due to small molecular structure provides added repellency
- Reduction in water absorption reduces spalling due to freeze-thaw and efflorescence, thereby increasing the life of the substrate
- Penetrating treatment will not change appearance of substrate
- Solvent-free and releases little Volatile Organic Compound (VOC) upon application

COMPOSITION

- Water-dilutable silane/siloxane emulsion
- Milky white
- 40% active ingredients as supplied

Active component for formulating penetrating water repellent treatments

APPLICATIONS

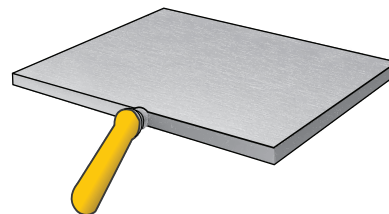
- For use on mineral substrates such as brick, stone, concrete and mortar that require water repellency

TYPICAL PROPERTIES

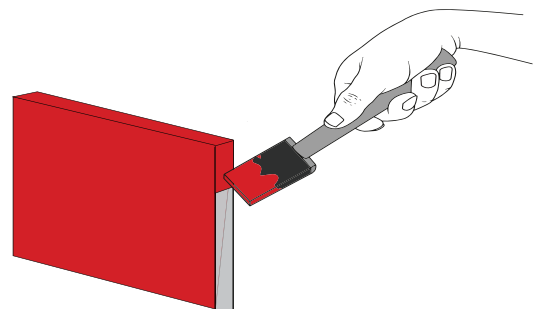
Specification Writers: These values are not intended for use in preparing specifications.

Property	Unit	Result
Color		Milky White
Active ingredient Level	%	40
pH		3.5-5.5
Specific Gravity at 25°C (77°F)		0.965
Flash Point, closed cup	°C (°F)	> 100 (212)
Density	lb/gal	8.1
Volatiles Organic Compound (VOC) Content ¹		
Exclusive of water and exempt compounds	g/L	< 500
Inclusive of water and exempt compounds	g/L	120
Solvent (Thinner)		Water

¹Determined in accordance with California Air Resources Board regulations.



[Dowsil 520 silane water repellent](#) is the treatment for cut edges.



Visible Fastening schedules and requirements

The following prescriptive panel fastening schedules apply to fiber-cement fastened directly to **vertical L/T-Profiles** with a 16 inch (406 mm) horizontal spacing. Refer to details 90.Fc.001-006 and the Intertek CCRR:

Allowable wind design pressures up to 95 psf:
Horizontal 4x8 panels: 10-1/2 inch max. screw spacing (35 fasteners per panel)
Vertical 4x8 panels: 10 inch max. screw spacing (40 fasteners per panel)

Allowable wind design pressures up to 80 psf:
Horizontal 4x8 panels: 14 inch max. screw spacing (28 fasteners per panel)
Vertical 4x8 panels: 15 inch max. screw spacing (28 fasteners per panel)

Allowable wind design pressures up to 66.5 psf:
Horizontal 4x8 panels: 21 inch max. screw spacing (21 screws per panel)
Vertical 4x8 panels: 22-1/2 inch max. screw spacing (20 fasteners per 4x8 panel)

The following prescriptive panel fastening schedules apply to vertically-oriented fiber-cement panels fastened directly to **horizontal profiles** with a 22-1/2 inch (572mm) vertical spacing. Refer to details 90.Fc.007-009 and the Intertek CCRR:

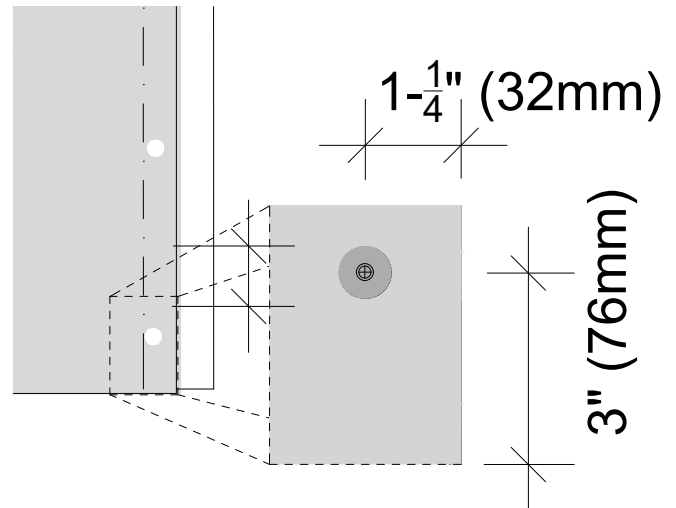
Allowable wind design pressures up to 98 psf:
Vertical 4x8 panels: 10-1/2" inch max. screw spacing (25 fasteners per panel)

Allowable wind design pressures up to 47.5 psf:
Vertical 4x8 panels: 21" inch max. screw spacing (15 fasteners per panel)

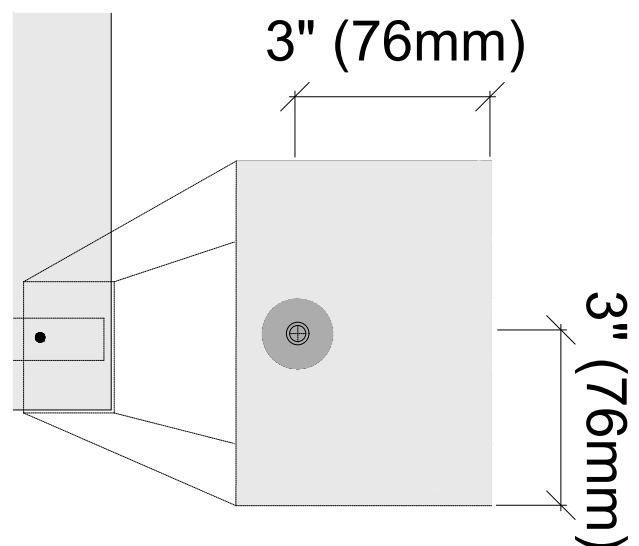
Alternatively, project-specific engineering can determine customized optimal fastening schedule(s) for individual projects.

Minimum Fastener-Edge Distances

F.C. (horizontal or vertical orientation) fastened directly to **vertical StoVentro Profiles**:
Keep fasteners a minimum of 1-1/4 in. (32mm) in from vertical edges of panels (edges parallel to the L/T-Profile) and 3 in. (76mm) up/down from horizontal edges (perpendicular to the Profile).



F.C. (vertically oriented) fastened directly to **horizontal StoVentro Profiles**:
Keep fasteners a minimum of 3 in. (76mm) in from vertical edges of panels (edges parallel to the Profile) and 3 in. (76mm) up/down from horizontal edges (perpendicular to the Profile).



In any case, maximum fastener-edge distance: 4 inch (100mm).



Fixed Points and Sliding/Gliding Points

To protect the fiber cement against damage caused by long-term thermal cyclic movement of the sub-construction, visible fastener (rivets and screws) bodies each require a perimeter buffer space around them. This is accomplished by pre-drilling the panels with oversized holes (10-11mm in diameter) in which the fasteners are centered. The EPDM tape added to the Profiles (see p. 21) before panel fixing further separates the panels from the expansion and contraction of the sub-construction Profiles.

For **SVFC Rivets**, which are the best visible fixing option and the recommended fastener, utilize the Centralizing Tool to pre-drill the L/T-Profiles through the panel holes. The tool's tip circumference is sized to match the pre-drilled panel hole (10mm) in order to position the drill bit in the center of the hole. The Centralizing Tool includes a 5.1mm (0.201 in.) drill bit to create pilot holes for the SSO-D15 stainless steel, dome head rivet. Clean out the aluminum shavings after drilling.

Each panel requires two fixed point fasteners, located near the panel center with the fixed point fasteners on two separate L/T-Profiles. Never install more than one fixed point fastener on a single Profile. For SVFC Rivets, fit one aluminum **Fixed Point Sleeve** over the rivet body before crimping the rivet in the pre-drilled hole at two pre-determined fixed point fastener locations. The rest of the pre-drilled holes will serve as sliding/gliding points and do not get sleeves. Always fasten the Fixed Point positions first and then work outward in a circular pattern from panel center to perimeter.



Centralizing Tool/Rivet Drill Bit (for 10mm panel fastener holes)



SSO-D15 5x18mm SVFC Rivet Fixed Point Sleeve Rivet Tool Nose Piece

Alternatively, **SVFC Screws and Centering Sleeves** maybe be used. These self-drilling screws each require a Centering Sleeve (aka grommet). **The black sleeves are for sliding/gliding points and the grey for fixed points only.** Each panel gets two fixed point screws on separate Profiles near the panel center. Every other screw is paired with a black sleeve. Place a Centering Sleeve in each pre-drilled hole prior to installing the self-drilling screws. Fasten the fixed point positions first and work outwards concentrically.

Do not use impact drivers or hammer drills to apply these screws. Once the screw head is all the way down, do not overtighten. A half-turn is sufficient once the screw head contacts the panel face.

Pre-Drilled Panel Fastening Holes:

10mm (25/64 in.) for SVFC Rivets and Fixed Point Sleeves

11mm (7/16 in.) for SVFC Screws with Centering Sleeves



Pre-Drilling T/L Profiles

Utilize the Centralizing Tool drill bit to pre-drill Profiles for SVFC Rivets.



Sliding Point Rivets - no sleeve

Most fasteners (all but two per panel) are Sliding Points.



Fixed Point Rivets - with sleeve

Two fasteners per panel are Fixed Points.



SVFC Screws

16mm pan head 5.5 x 25 mm (3/16 x 15/16 in.) self-drilling (stainless steel) with fixed (grey) and sliding (black) point Centering Sleeves. Every panel fastening hole gets a Centering Sleeve with all but two being sliding points.



Pre-Drilling T/L Profiles

When drilling the Profiles with the Centralizing Tool, be sure to keep the drill bit aligned perpendicular to the Profile and fiber-cement.



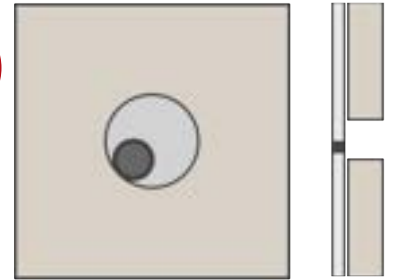
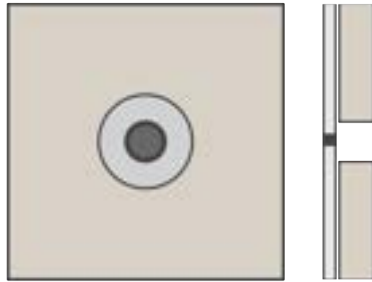
Metal Shavings

When drilling the Profiles with the Centralizing Tool drill bit, metal shavings will be generated. Clean these out prior to fastening the rivets.

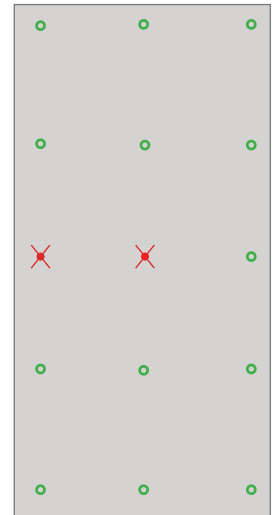
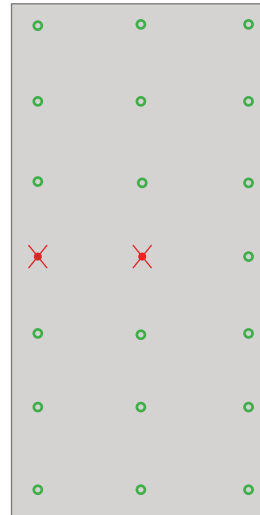
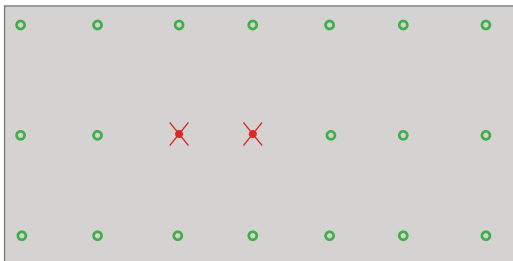


Centered Rivet Hole

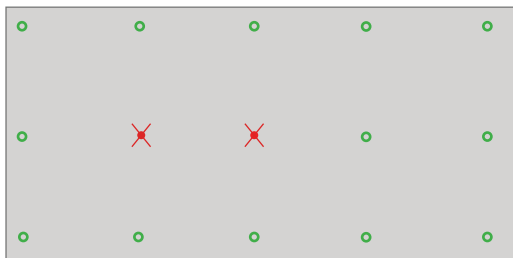
The Centralizing Tool enables the holes for rivets to be perfectly aligned in the middle of the panel holes.

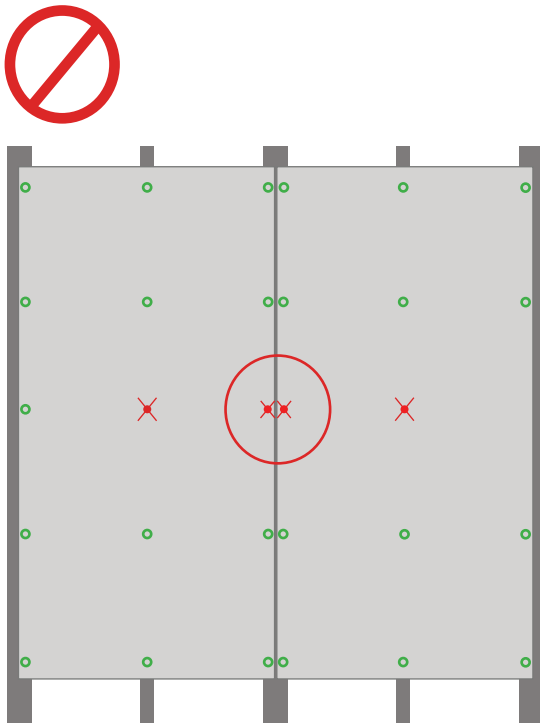


- sliding point
- ✗ fixed point



Example fixed and sliding point fastener patterns. Fixed points must occur on different Profiles as close to the panel center as possible.



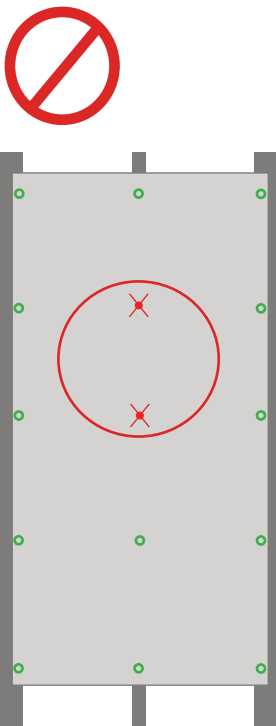


Do NOT position fixed points for two panels on the same Profile.

Prescriptive Fastening Diagrams

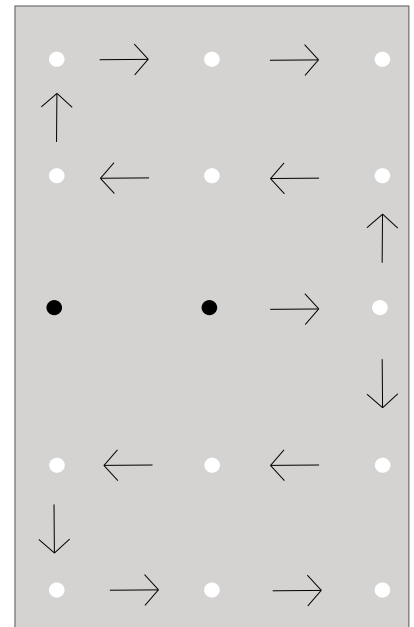
The fastening diagrams on the following pages detail prescriptive StoVentro Sub-construction and SVFC fastening schedules that meet certain allowable wind design pressures. Refer also to the StoVentro detail on page 14 (90.Fc.000) which was utilized in each of the prescriptive designs. The key factor in these prescriptive designs are the **maximum** fastener spacings. With the same sub-construction configuration, any fastener spacings less than the tested spacings also meet the same allowable wind pressures. This is important because it provides for design flexibility with panel sizes. The exact fastener spacings depend on the panel dimensions, orientation, and the minimum fastener-edge distances.

In addition to the prescriptive options, **SVFC may be fully custom engineered to specific projects.** Sto's extensive wind load and fastener pull-through testing for fiber-cement and engineering load tables for StoVentro can be used to tailor optimized assemblies for any project.

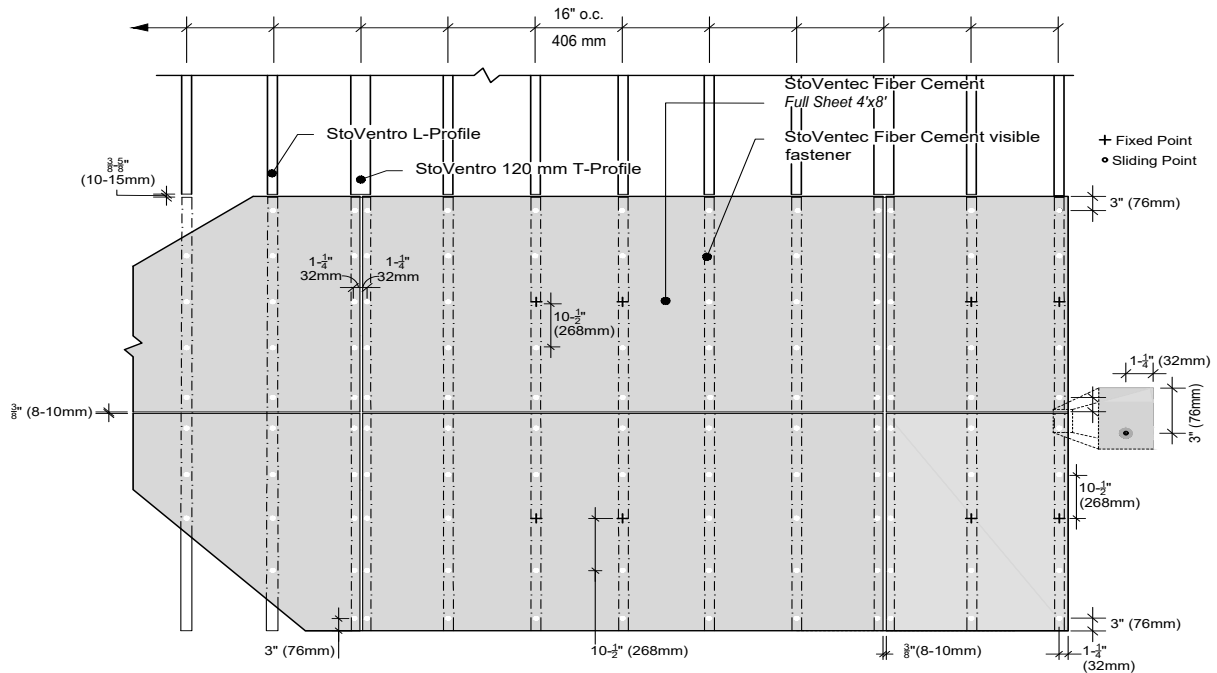


Do NOT position the two fixed points for one panel on the same Profile.

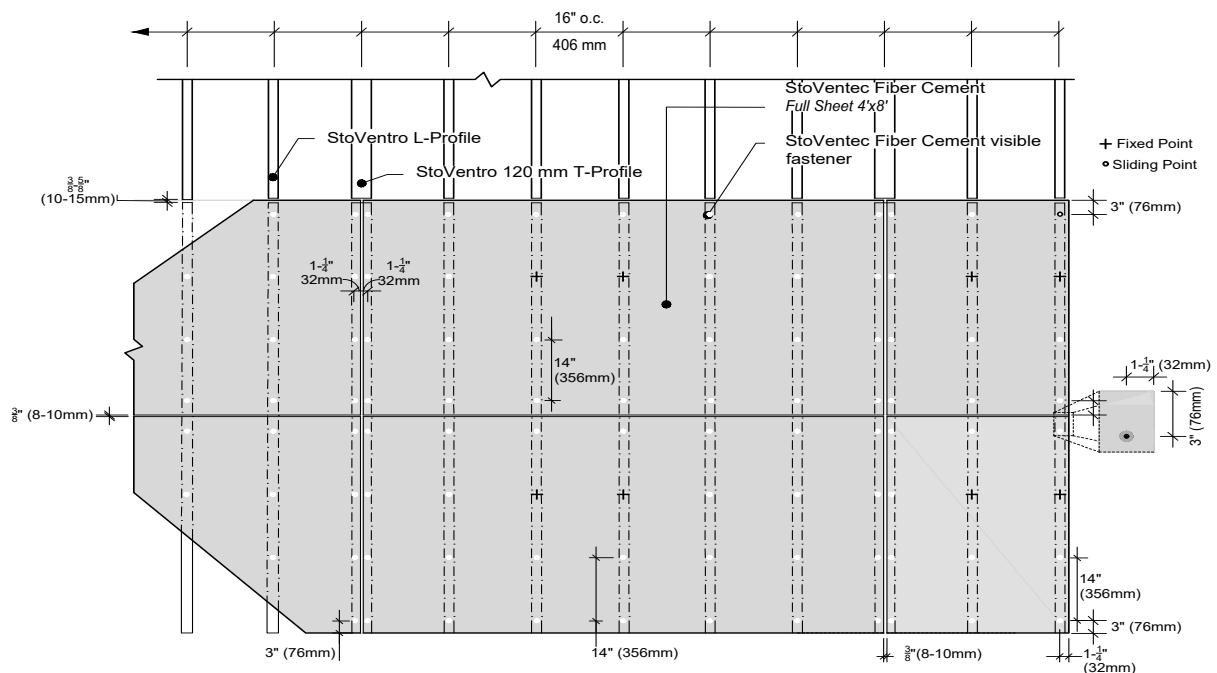
Fasten panels first at the Fixed Point positions and work concentrically from the middle out to the panel perimeter.



**StoVentec F.C. fastening diagram 90.Fc.001: 10-1/2 in. max. fastener spacing
– horizontal 8mm panels, allowable wind loads up to 95 lb/ft²***



**StoVentec F.C. fastening diagram 90.Fc.002: 14 in. max. fastener spacing
– horizontal 8mm panels, allowable wind loads up to 80 lb/ft²***



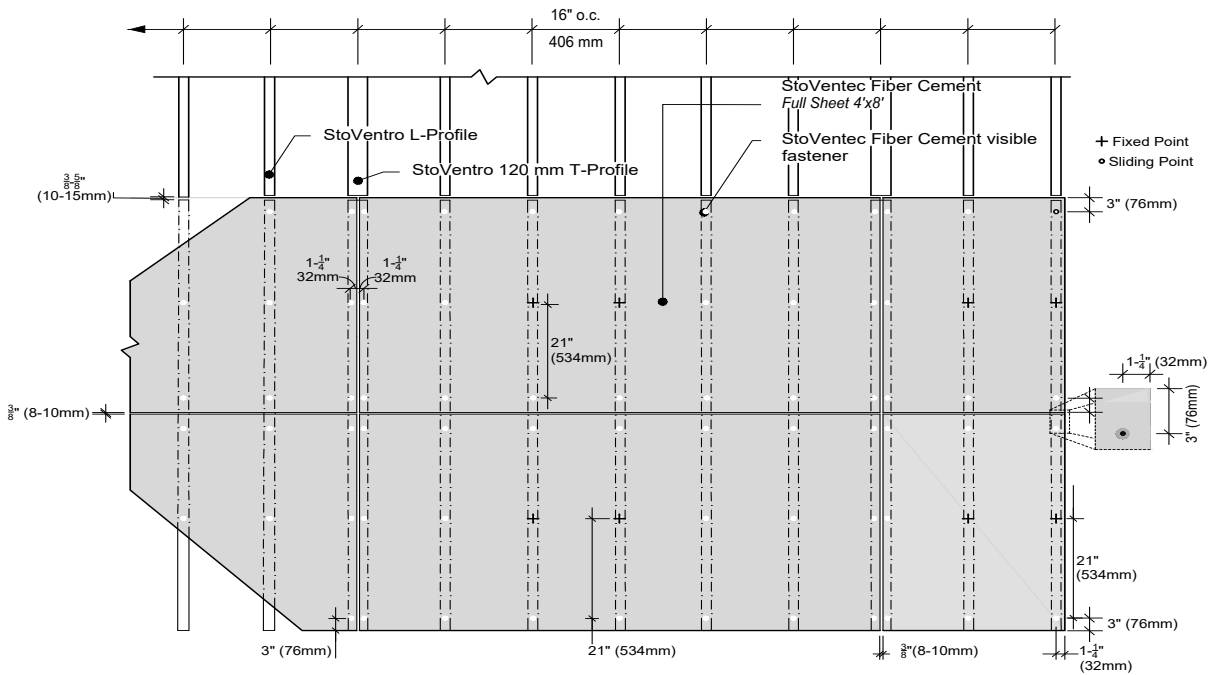
Notes

1. Refer to the SVFC Design Guide and online details in the Sto Corp website Document Center for Sto details [90.Fc.001-006](#).
2. For staggered/running-bond layouts, exchange L-Profiles for 120mm T-Profiles as necessary to ensure all vertical panel joints meet on T-Profiles.
3. Horizontal joints between vertical Profiles require a 10-15mm gap (3/8 - 5/8 in.). Do NOT span the gap with fiber cement as panels may never be fastened on both sides of such metal joints.
4. Joints between panels are spaced 8-10mm (~3/8 in.).
5. Two (2) Fixed Point fasteners must occur on separate Profiles near the panel centers. Always fasten the Fixed Points first and work in a circular pattern outwards from the middle.

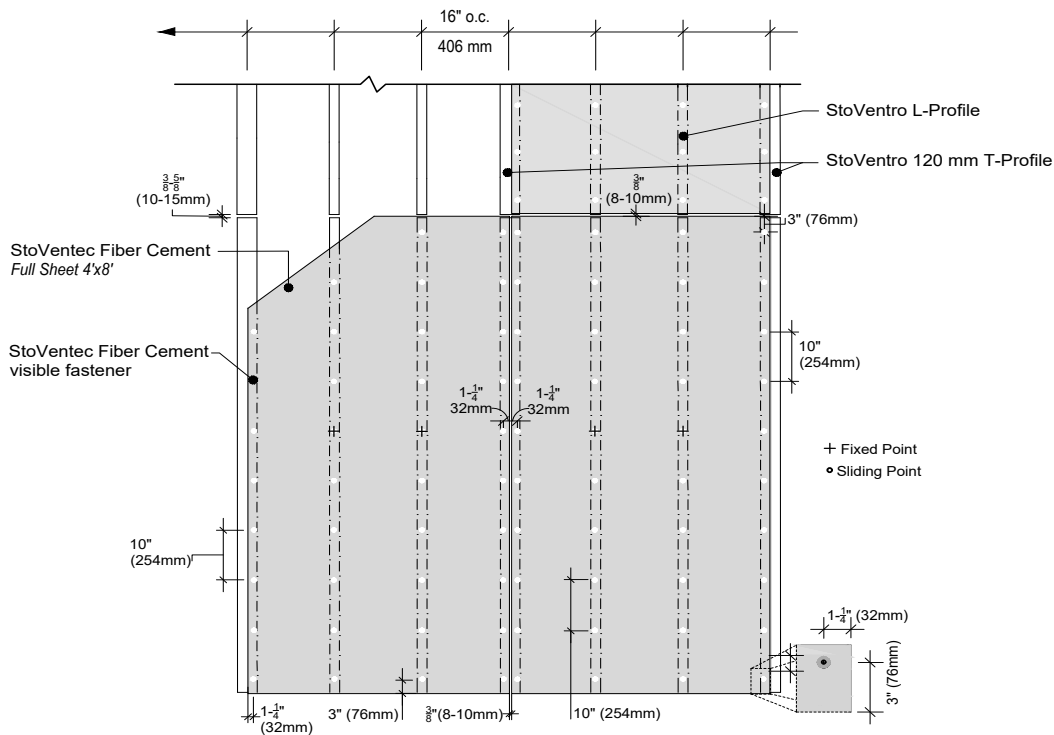
* All wind loads stated refer to the allowable design pressure of the building components and cladding per ASCE 7. A safety factor of 2.0 is included.



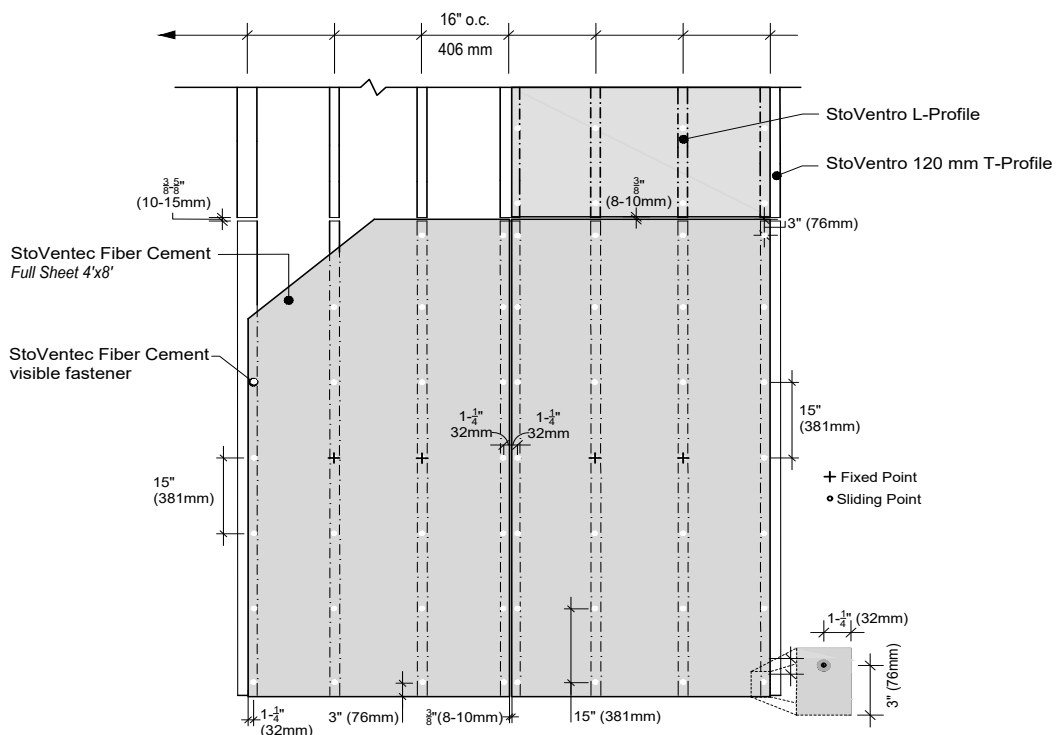
**StoVentec F.C. fastening diagram 90.Fc.003: 21 in. max. fastener spacing
 – horizontal 8mm panels, allowable wind loads up to 66.5 lb/ft²***



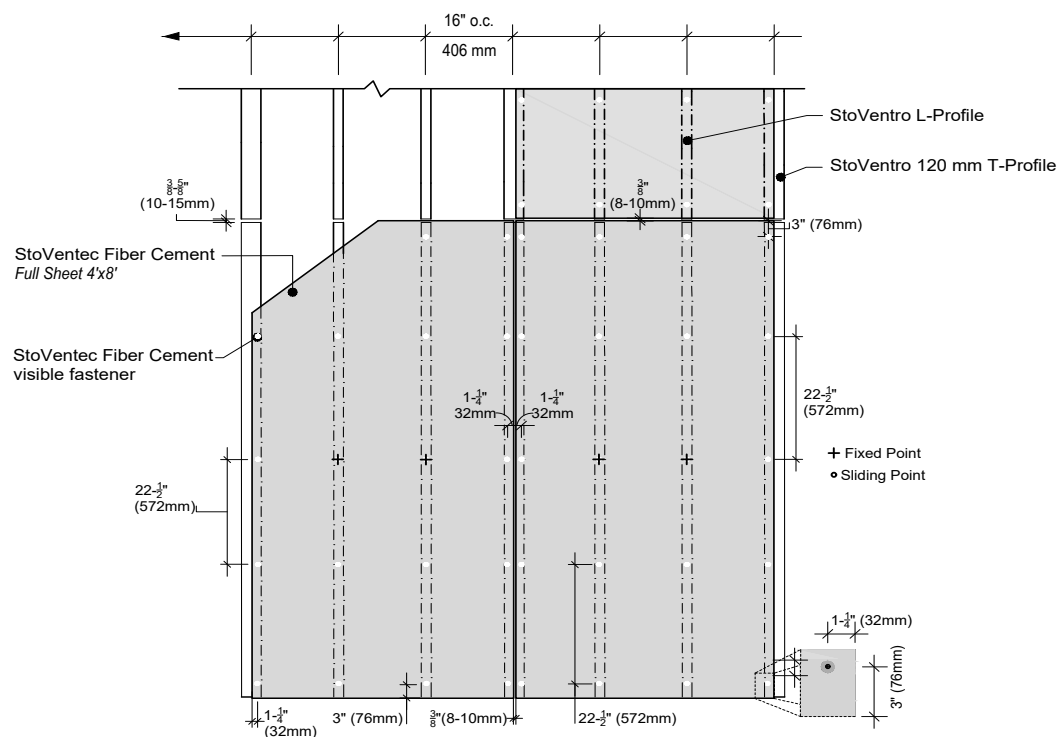
**StoVentec F.C. fastening diagram 90.Fc.004: 10 in. max. fastener spacing
 – vertical 8mm panels, allowable wind loads up to 95 lb/ft²***



StoVentec F.C. fastening diagram 90.Fc.005: 15 in. max. fastener spacing
 – vertical 8mm panels, allowable wind loads up to 80 lb/ft²*



StoVentec F.C. fastening diagram 90.Fc.006: 22-1/2 in. max. fastener spacing
 – vertical 8mm panels, allowable wind loads up to 66.5 lb/ft²*





Concealed Fastening

SVFC in 10mm thickness may be installed with a concealed fastening system. Professional fabrication services are necessary to prepare panels for this concealed anchoring system. [SFS TUF-S 6x9](#) hidden fasteners (specialized rivets) are paired with StoVentro Carrier Profile Hangers, which are four inches wide and pre-drilled with two 1/4 inch (6.5mm) holes, two inches (50mm) apart along the hanger midline.

Corresponding holes are pre-drilled into the back surface of the 10mm SVFC panels. These holes are 6mm in diameter and 7mm deep and made with professional CNC fabrication equipment or a drill bit equipped with a depth-stop accessory. Observe and maintain the minimum fastener-to-panel-edge distances.

Using a rivet tool capable of pulling 1/4 inch (6.5mm) rivets, affix two TUF-S 6x9 threaded rivets to the panels, securing the Carrier Profile Hangers. If necessary, lightly tighten the fasteners by hand with a hex head screwdriver, about a 1/4 turn, so that the Hanger is not loose. The ASTM E330 tested configuration is detailed in 90.Fc.010. For a full 4x8 panel, twenty (20) carrier profile hangers (22-1/2 in. apart vertically) and forty (40) TUF-S hidden anchors are needed.

Affix StoVentro Agraffe Rails to the vertical Profiles using sliding and fixed points to allow the rails to expand and contract thermally. Oblong slots (5.5x20mm) must be punched in the Agraffes to create the sliding points. Utilize fixed points at one vertical Profile. The rest of the agraffe fasteners must be sliding points. Fasten Agraffes to vertical T-Profiles with two StoVentro Sub-construction Screws at each rail. Leave a 3/8 to 5/8 inch (10-15mm) gap between Agraffe ends to allow for expansion.

Hang the panel/hidden anchor/hanger assemblies on the Agraffes so that the Hangers are fully seated within them.

Prevent lateral movement of the fiber-cement panel by adding a StoVentro Screw or cotter pin into the top of one of the Carrier Profile Hanger/Agraffe overlaps at the top of each panel.

SFS TUF-S 6x9 hidden anchor



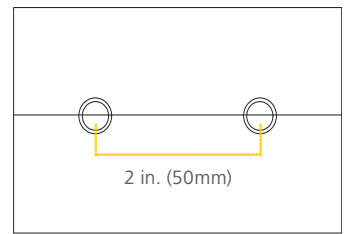
6mm drill bit with depth stop for hidden anchors



Carrier Profile Hanger (section)



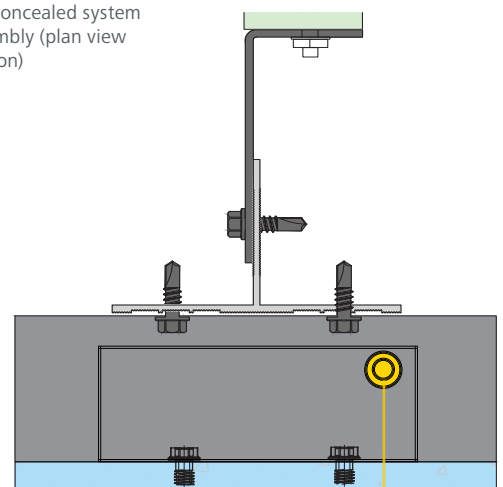
Carrier Profile Hanger detail - two 1/4 in. (6.5mm) holes for the hidden anchors



Agraffe Profile (section)



Full concealed system assembly (plan view section)

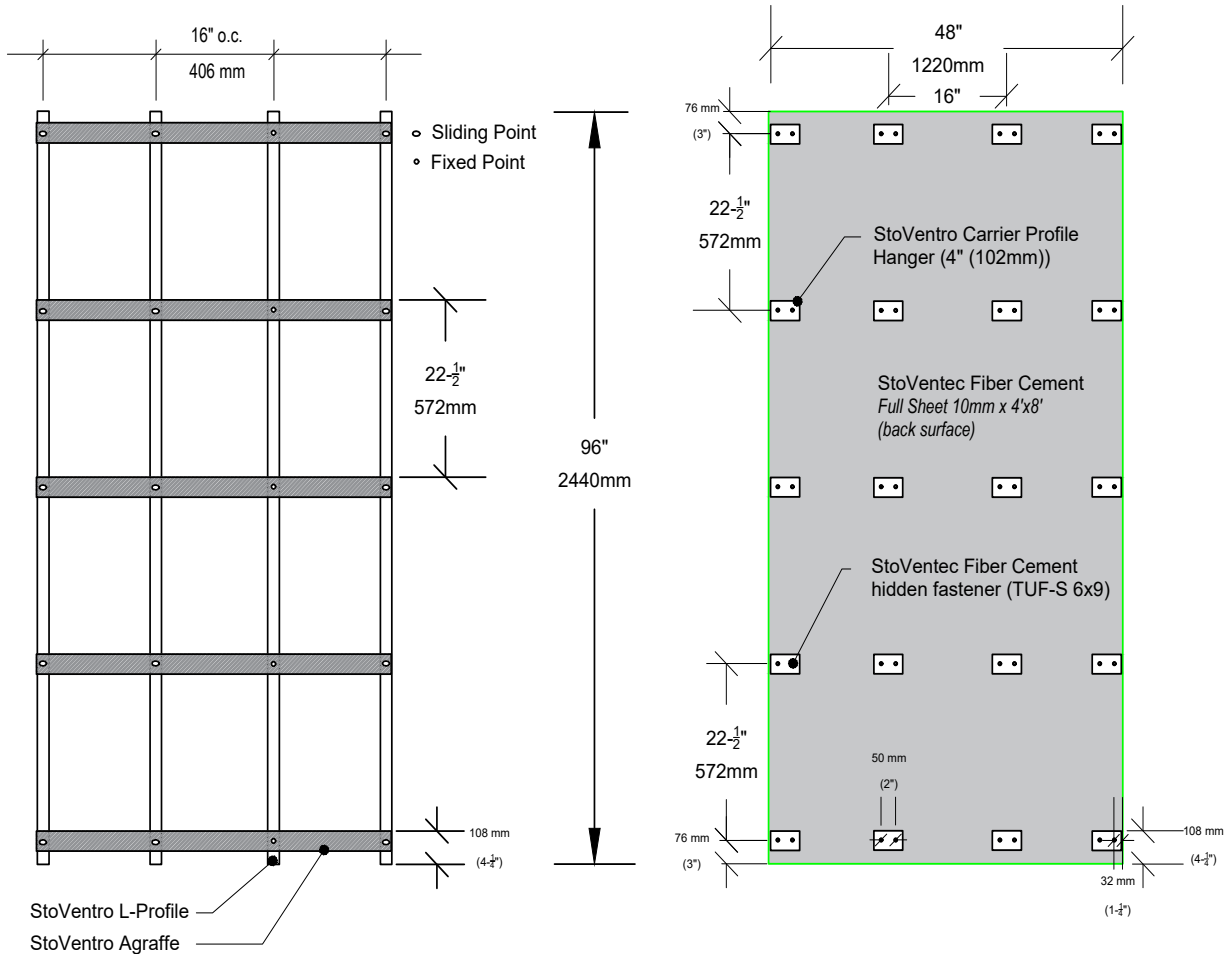


StoVentro Screw (or cotter pin) through top of Hanger and Agraffe to prevent lateral movement of panel

StoVentec F.C. concealed fastening diagram 90.Fc.010: 22-1/2 in. max. fastener spacing – vertical 10mm panels, allowable wind loads up to 70 lb/ft²*

Layout Notes:

1. 10mm thick StoVentec Fiber Cement panels required for hidden fastening installation.
2. Horizontal and vertical joints between Ventro profiles - leave 10-15mm gap between metal ends.
3. StoVentro Agraffe Rails must be spaced to match Carrier Profile Hangers affixed to the back surface of StoVentec Fiber Cement panels with SFS TUF-S 6x9 fasteners.
4. Joints between panels are spaced 8-10mm (~ $\frac{3}{8}$ ").
5. Refer to the *StoVentec Fiber Cement Design Guide* or full *Install Guide* for more information on hidden fastening.



Leave a 3/8 to 5/8 inch (10-15mm) gap between Agraffe ends to allow for expansion. Note the oblong sliding fastening points.



As desired at panel joint locations, spraypaint the sub-construction with black paint to minimize appearance of the anodized aluminum.



Details - Installation at grade

Starter profile installation



1

Determine the SVFC system base height before starting installation work (see also page 16) and mark it with a plumb line. Apply the foundation level and perimeter insulation according to the specifications and application guidelines.



2

Ensure continuity of the StoGuard air and water-resistive barrier at the Starter Profile level and transition between the wall and slab/foundation. The Starter Profile aids in securing and protecting the bottom course of continuous insulation.



3

Align the starter profile horizontally and flush at the previously determined height and fix it with appropriate anchors (i.e. steel stud, concrete fasteners, etc.) to studs, sill plate, or concrete/masonry every 24 in. (610 mm) (max.). Level out any unevenness of the substrate with shims.



4

With profile joints, use the two exterior bore holes for fixing. Form a joint approx. 1/8 in. (3 mm) wide between the individual profiles.



5

At building corners, miter-cut the starter profile, join it so that it is straight-edged, or overlap it.

Refer to pages 16-21 for StoVentro sub-construction installation.

Product tips



Sto-Ventilation Profile Alu

Profile for securing system ventilation and small animal protection in the base area and the lower end of the system (dimensions 30 x 40 mm and 40 x 100 mm)



First course panel installation

SVFC is a rainscreen cladding system and fiber-cement is not immune to water damage from persistent soaking or immersions. Therefore, always ensure and maintain minimum clearances to allow proper system ventilation and drainage:

- finished soil grade: 6 inches (150mm)
- hardscape, decking, roofing: 2 inches (50mm)

Install Ventilation Profiles along the bottom of the L/T Profiles to protect the rainscreen/ventilation plane from small animal entry. To avoid fastening the ventilation profiles on the surface of the L/T Profiles, where the fasteners would interfere with the fiber-cement, affix small L-angle pieces to the Profile flange that is fastened to the StoVentro Brackets. Then fasten the ventilation profiles to the L-angles.

Panels may cantilever below the bottom edge of the vertical sub-construction Profiles. The bottom row of panel fasteners must align a minimum of 3 inches (75mm) above the panel edge (see page 25).

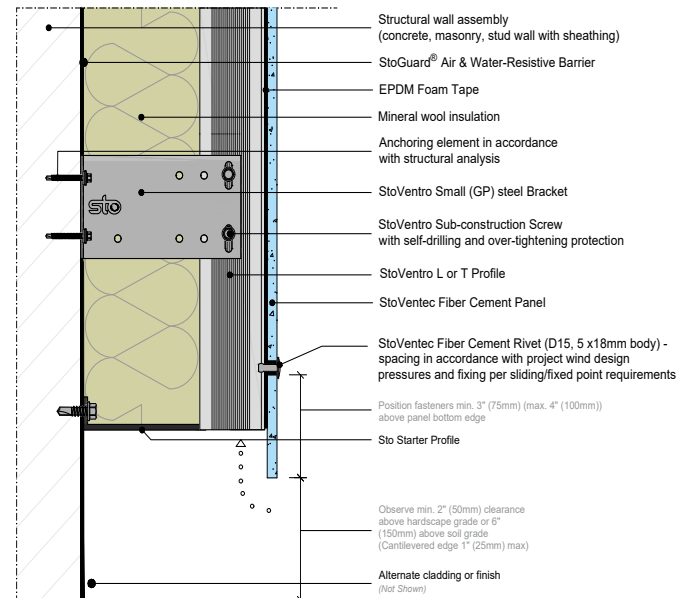
Pencil mark the Profiles where the top of the first panels should align. A minimum of two installers should lift and hold the panel into position while another uses the Centralizing Tool to pre-drill the rails for SVFC Rivets, removes debris with soft brush or air spray, and then fastens the panel, always starting at the fixed point positions in the middle with Fixed Point Sleeves and working outwards to the sliding points. Temporary horizontal support rails can be utilized to help hold the first panel during positioning and fastening.

Always fasten at a 90 degree angle, perpendicular to the panel face.

The next panel must be spaced 8-10mm (~3/8 inch) next to or above the first. Use a horseshoe shim or other spacer to ensure consistent joint spacing.

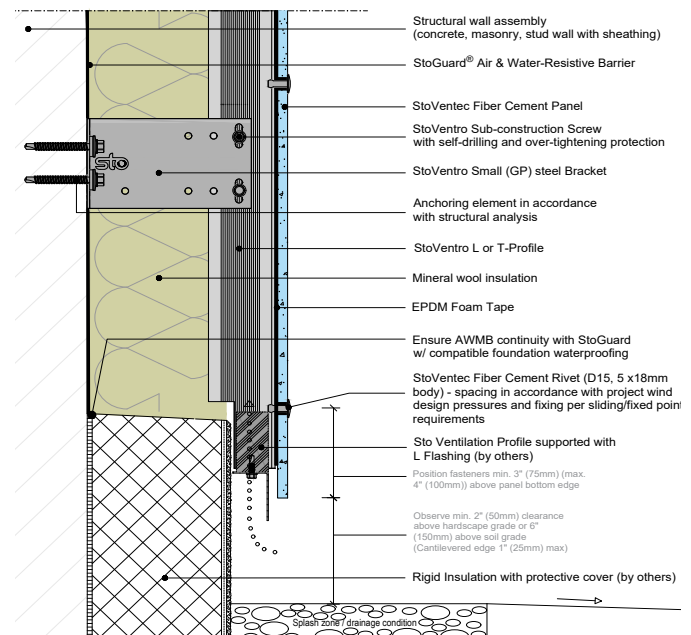
Grade details

Base detail for a set-back slab (or alt. cladding) with Sto-Starter Profile



Sto Detail 90.Fc.055

Grade detail for a set-back slab with rigid insulation board in a splash zone

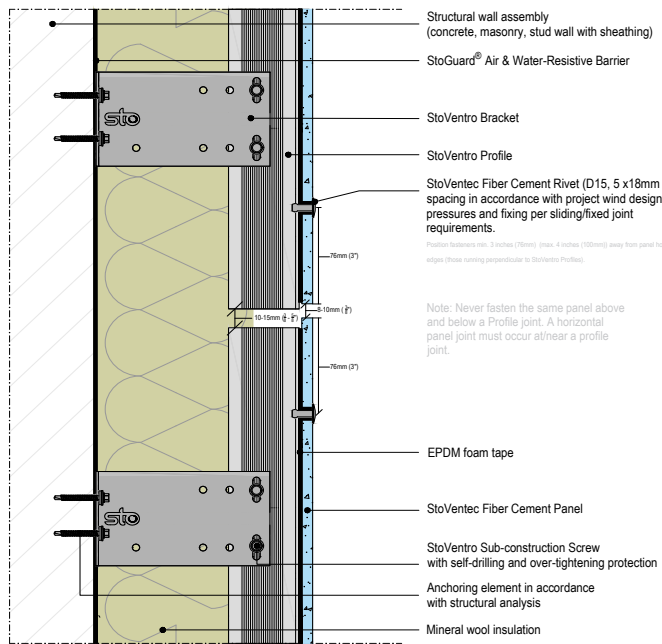


Sto Detail 90.Fc.065

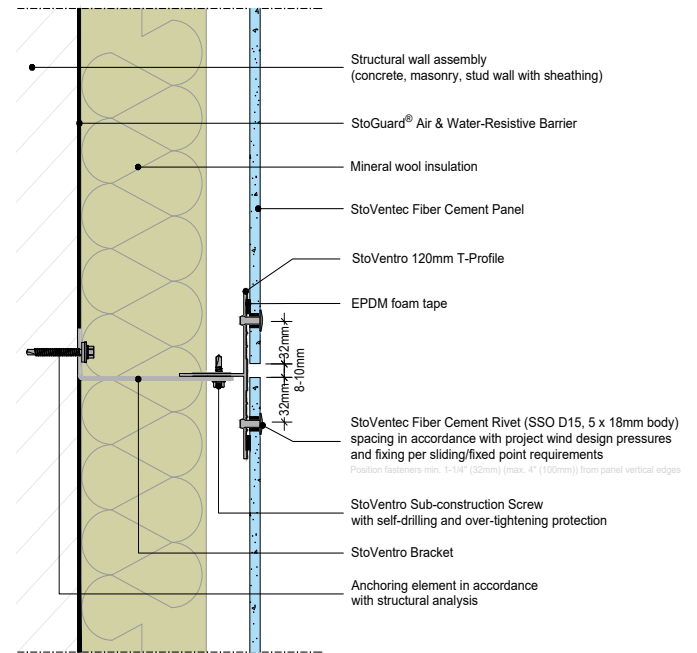


Details - Panel joints

Panels Joints and T/L-Profile Joints



Panel Joints - vertical (plan view)



StoVentec T/L-Profiles are 8 or 10 feet (2440 or 3050mm) in length/height. A gap of 5/8 inch (15mm) is required between the Profile ends to allow for thermal expansion. **Do not span over these joints with fiber cement such that panels are fastened to both rails.**

Sto detail 90.Fc.035

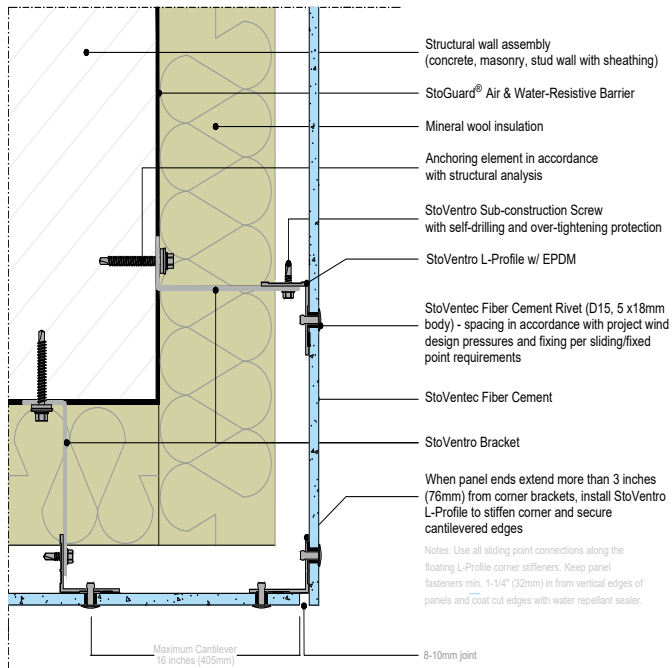
StoVentec T-Profiles (120mm) are required at vertical joints between fiber-cement panels. Use spacers to ensure a consistent 8-10mm (~3/8 in.) gap between panels. Refer to Fastener Edge Distances on page 25 as well as detail 90.Fc.032.

Prior to f.c. installation, if desired, add black spray paint to the center of the T-Profile to minimize appearance of the aluminum.

Sto detail 90.Fc.032

Details - Outside Corners

Outside corners – F.C. to F.C.



When panel edges must cantilever more than 3 inches (76mm) from the corner brackets, vertical L-Profiles (maximum length ~10 ft (3 m)) are installed on the rear side of the previously installed panels of the first installed wall to brace the corner, taking into consideration a tolerance-based panel projection. The L-Profiles are fixed to panels with SVFC Rivets observing edge distance rules (see page 25) and sliding points only.

Align the L-Profiles so they are perpendicular over the entire building height.

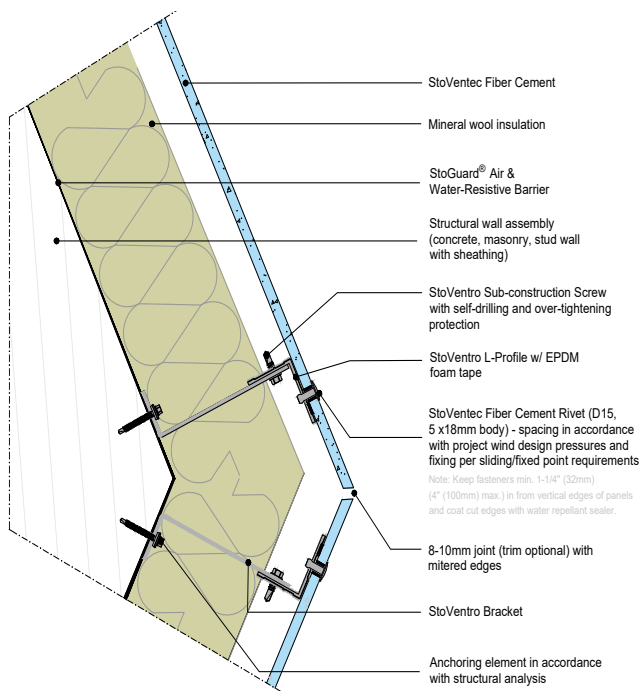
When panels meet at corners, leave an 8-10mm (~3/8") joint space. Fasten panel corners on both sides of the floating L-Profile utilizing all sliding points.

Sto Detail 90.Fc.410



Details - Outside Corners

Outside corners – Radius/Non-90 degree



Accomplish radius walls with fiber-cement by utilizing non-90-degree corners. Miter cut panel edges to allow for a consistent 8-10mm (~3/8 in.) joint. Trim is optional.

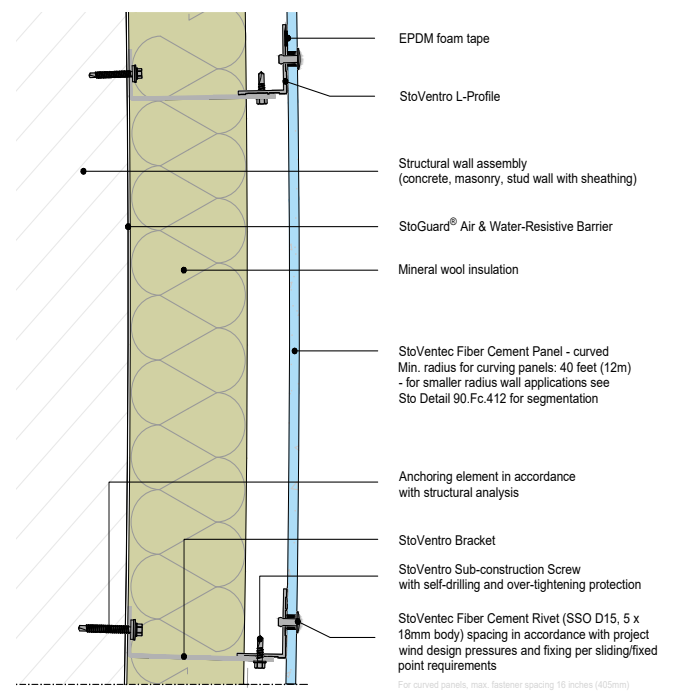
The maximum panel edge cantilever is 4 inches (100mm). Observe the fastener-to-panel-edge distance requirements.

Sto detail 90.Fc.412

Note

Open joints are standard for StoVentec Fiber Cement but not required. If desired, numerous third party trim metal options are available for fiber-cement corner, transition/termination, and joint details.

Gentle Curves - Radius walls \geq 40 Feet (12m)

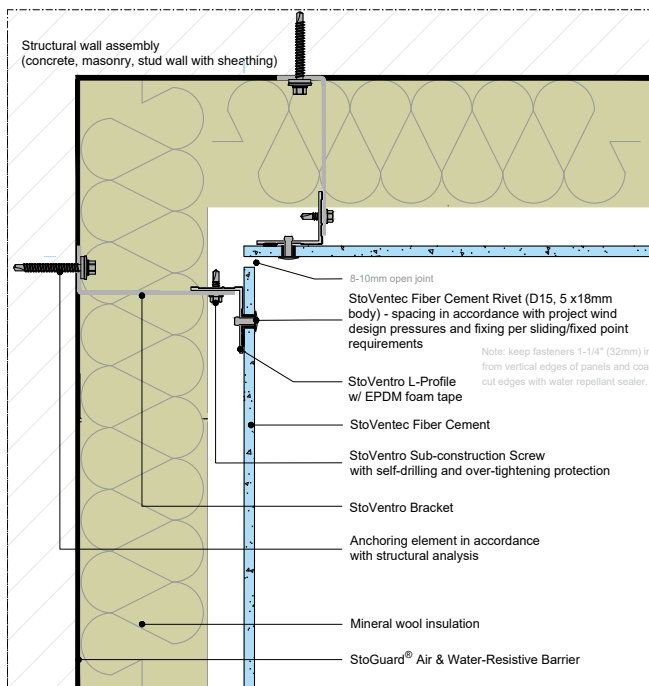


For gentle curves of a radius 40 feet (12m) or greater, panels may fit the curve. Fasten the panels following the same general requirements and procedures.

Sto detail 90.Fc.415

Details - Inside Corners

Inside corners – F.C. to F.C.

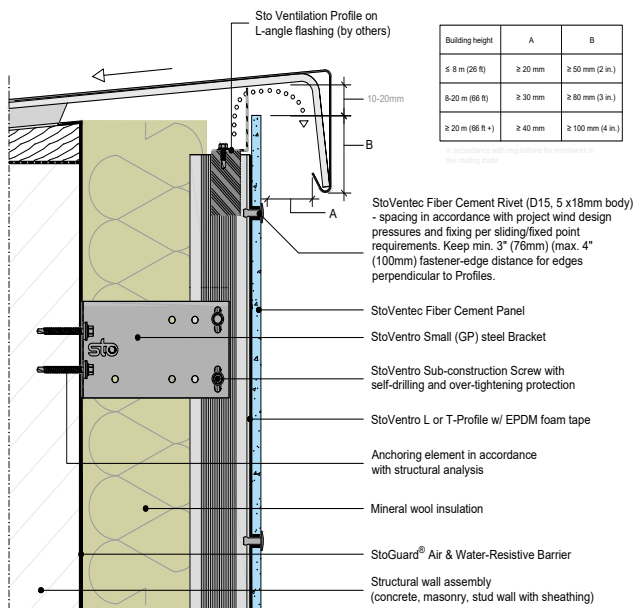


Use spacers to ensure a consistent 8-10mm (~ $\frac{3}{8}$ in.) gap between panels. Refer to Fastener Edge Distances on page 25 as well as Sto Detail 90.Fc.400.

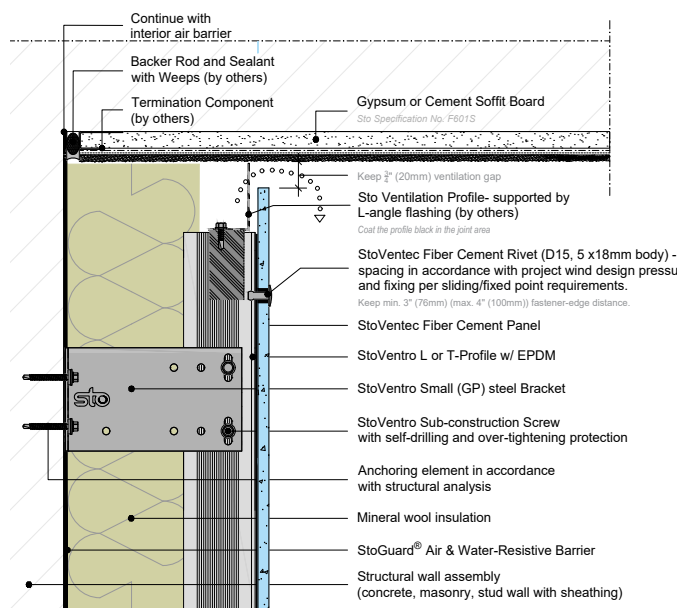


Details: Roof connections

Parapet connection with 10-20 mm ventilation gap



Soffit connection with 10-20 mm ventilation gap



Provide a minimum 3/8 to 3/4 in. (10 - 20 mm) gap between the top of the fiber-cement and parapet cap, soffit, or ceiling (outdoors).

For parapets: there must also be an air space greater than or equal to 10 mm between the downward-pointing front flange of the parapet cap and the face of the fiber-cement to allow for ventilation of the rainscreen cavity.

As building height increases, the dimension of the downward-pointing front flange of the parapet cap (B in the detail above) also increases as does the air gap depth (A). Refer to the table provided.

Sto Detail 90.Fc.180

Provide a minimum 3/8 to 3/4 in. (10 - 20 mm) gap between the top of the fiber-cement and parapet cap, soffit, or ceiling (outdoors). Refer to Fastener Edge Distances on page 25.

Sto Detail 90.Fc.161

Product tip

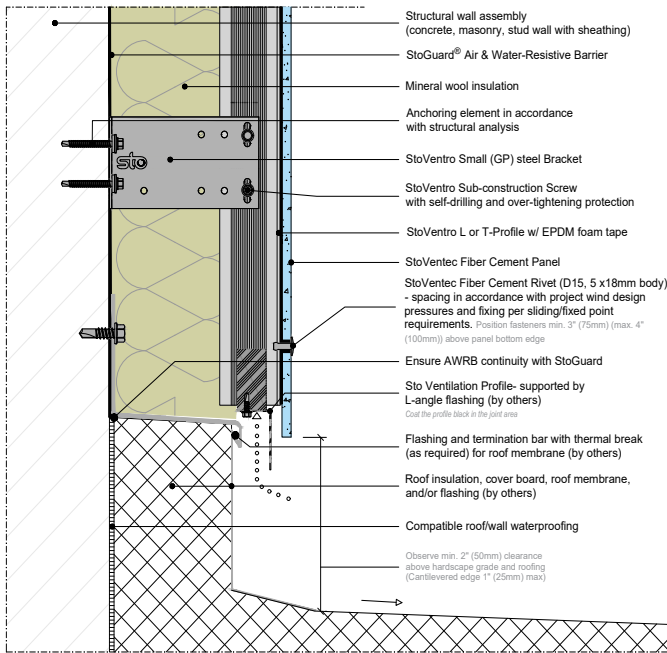


Sto-Ventilation Profile Alu

Profile for securing system ventilation and small animal protection in termination locations with a ventilation and drainage gap/clearance (dimensions 30 x 40 mm and 40 x 100 mm)

Details - Windows and doors

Clearance above roof

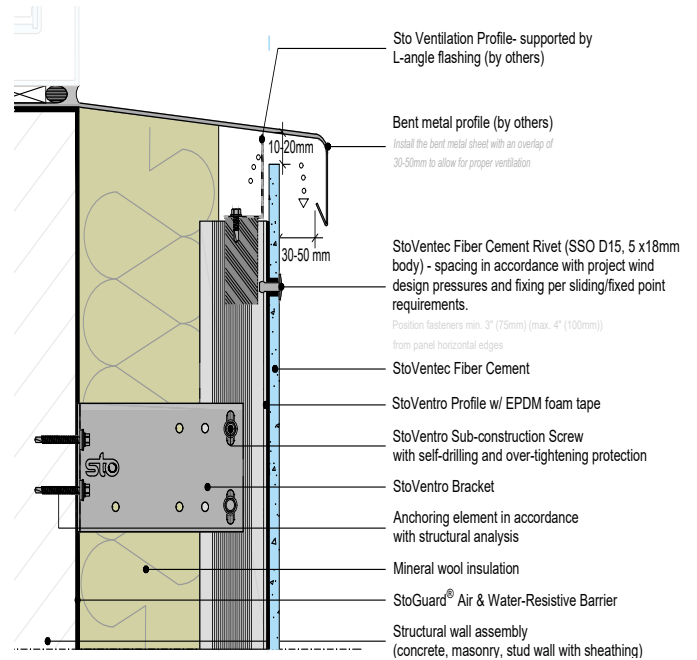


Provide a minimum 2 inch (50mm) clearance above roofing. Utilize Sto Ventilation Profile to keep the rainscreen plain open and prevent small animal intrusion.

Refer to Fastener Edge Distances on page 25.

Sto Detail 90.Fc.150

Window sill connection with ventilation gap



Provide a minimum 3/8 to 3/4 in. (10 - 20 mm) gap between the top of the fiber-cement and metal window sill (by others).

There must also be an air space of 1-1/4 to 2 in. (30 to 50 mm) between the downward-pointing front flange of the window sill profile and the face of the fiber cement to allow for ventilation of the rainscreen cavity.

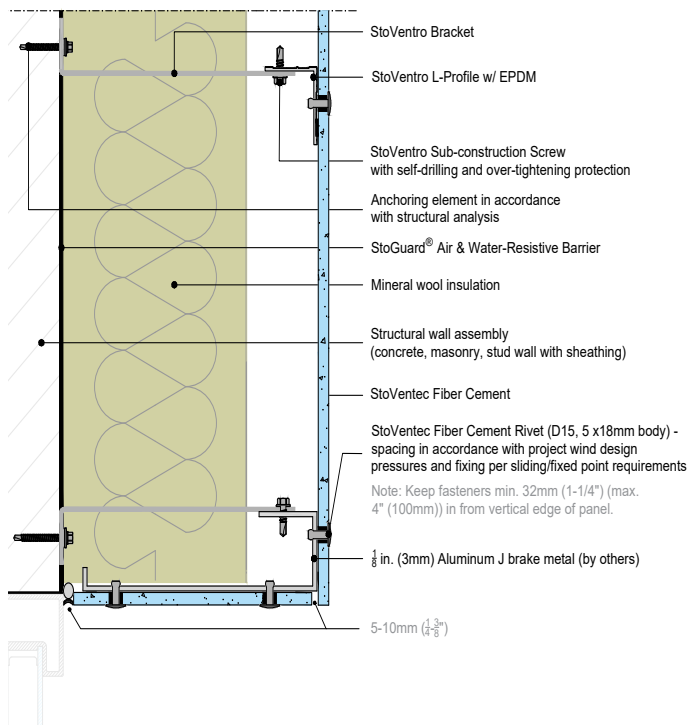
The dimension of the downward-pointing front flange of the window sill should be between 2 to 3-3/8 in. (50 to 85 mm).

Sto Detail 90.Fc.090

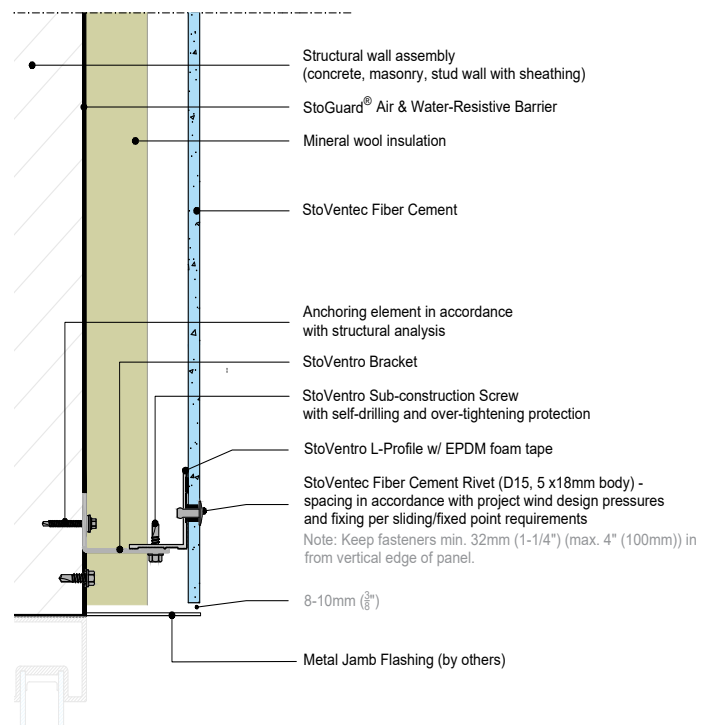


Windows and doors

Window jamb - F.C. return



Window jamb - metal flashing return



Note

For correct waterproofing and installation of the windows and doors, observe the manufacturer specifications as well as the appropriate StoGuard AWRB instructions, if applicable.

For opening returns (380mm or less in depth), fiber-cement may be installed relying on a custom J brake metal profile (3mm (1/8 in.) aluminum (by others) fastened to StoVentec Brackets in keeping with the typical fixed and sliding point connections.

Fasten the jamb return piece with anchors 1-1/4 - 4 inches (32-100mm) in from the vertical edges with one fixed point per panel near its center. Leave 1/4 to 3/8 inch (5-10mm) gaps between the return panel edge and the main facade panel and the opening jamb.

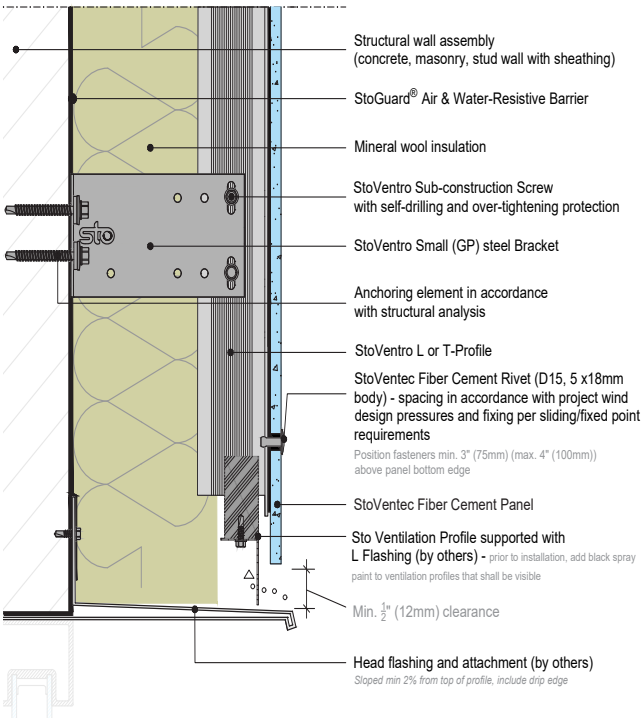
Sto Detail 90.Fc.088

For opening returns of any depth, metal flashing returns (by others) may be utilized.

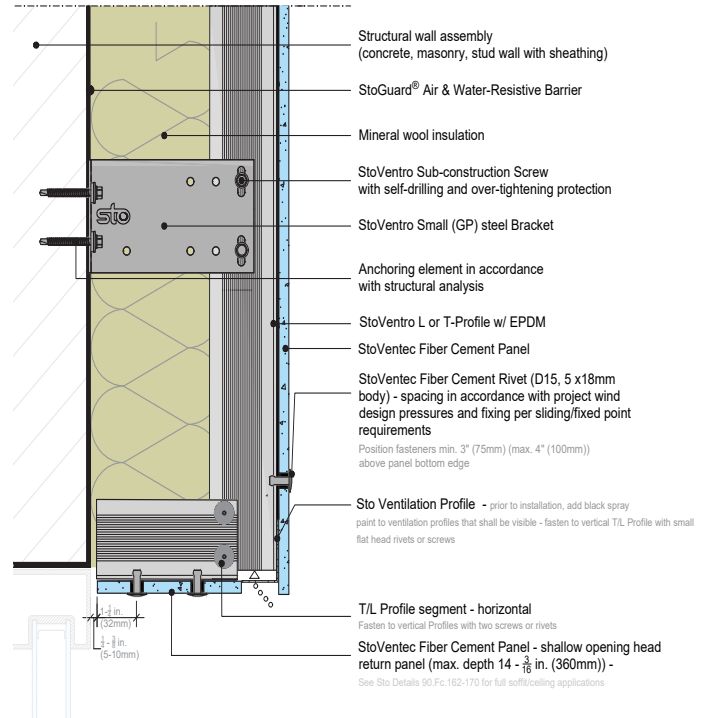
Leave 3/8 inch (10mm) gaps between the facade panel edge and the metal opening jamb return. Observe fastener to panel edge distance requirements (see p. 25).

Sto Detail 90.Fc.086

Window/door head - metal flashing return



Window/door head - fiber-cement return

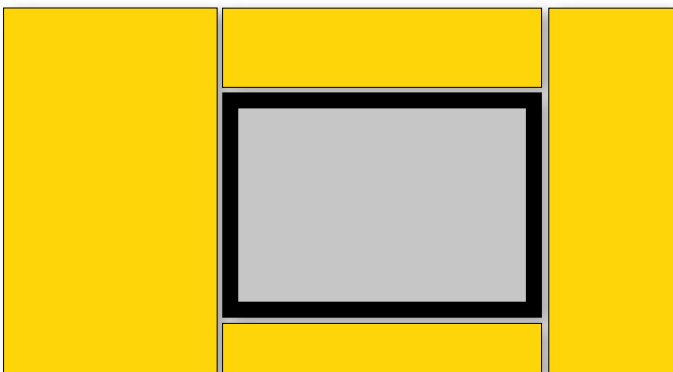


At window heads, utilize metal head flashing (by others) and keep a minimum 1/2 in. (12mm) clearance between the bottom edge of fiber-cement and the flashing. Utilize Sto Ventilation Profile, spray painted black, to finish the gap without obstructing ventilation and drainage.

Sto Detail 90.Fc.080

Note

Align panel joints to opening jamb, head, and/or sill lines. Do not notch cut panels around openings.



For fiber-cement returns at opening/window heads up to 360mm (14-³/₁₆ in.) in depth, fiber-cement may be utilized per detail .084 above. For deeper applications, the soffit/ceiling details are necessary. See pages 44-45.

Secure segments of StoVento T/L Profiles to the vertical Profiles that extend back towards the opening. Utilize at least two rivets or screws (such as StoVento Screws) to fasten the segments to the vertical Profiles.

Fasten fiber-cement opening return panels in keeping with fastener-edge-distance and fixed/sliding point requirements.

Utilize Sto Ventilation Profile, spray painted black, to finish the gap without obstructing ventilation and drainage. The smaller size Ventilation Profile has a 30mm (1-³/₁₆ inch) leg that is ideal for this detail.

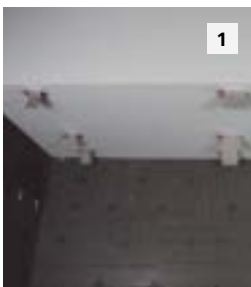
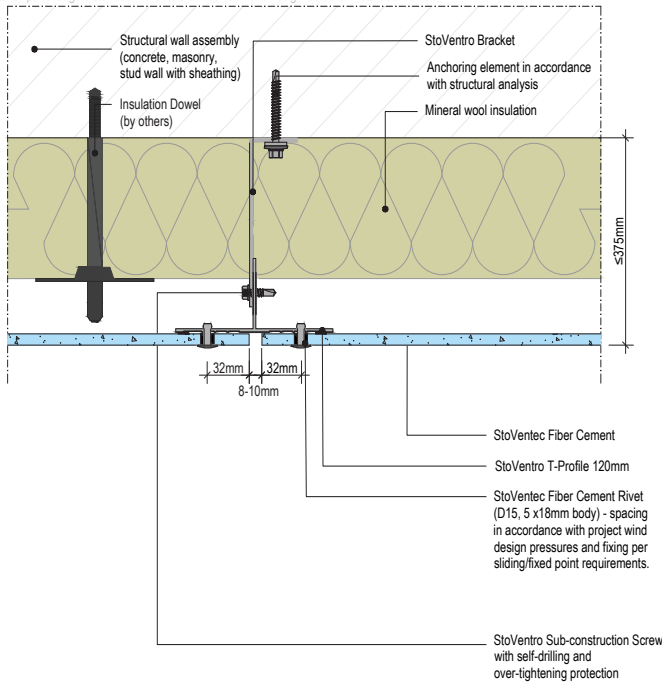
Sto Detail 90.Fc.084



Soffits

SVFC as soffit

Note: This detail assumes the soffit panel long dimension runs parallel to the vertical wall. Keep typical minimum fastener-panel edge distances. Refer to the Fiber Cement Design Guide or Installation Guide.



1

Anchor the wall brackets as suspensions in the load-bearing substrate with appropriate fasteners per project-specific engineering.



2

Install the insulation with insulation dowels (by others) per insulation manufacturer instructions for soffit conditions.



3

Install the T/L-Profiles as horizontal support profiles in the same fashion as described on page 20 for vertical profiles inclusive of fixed and sliding points.

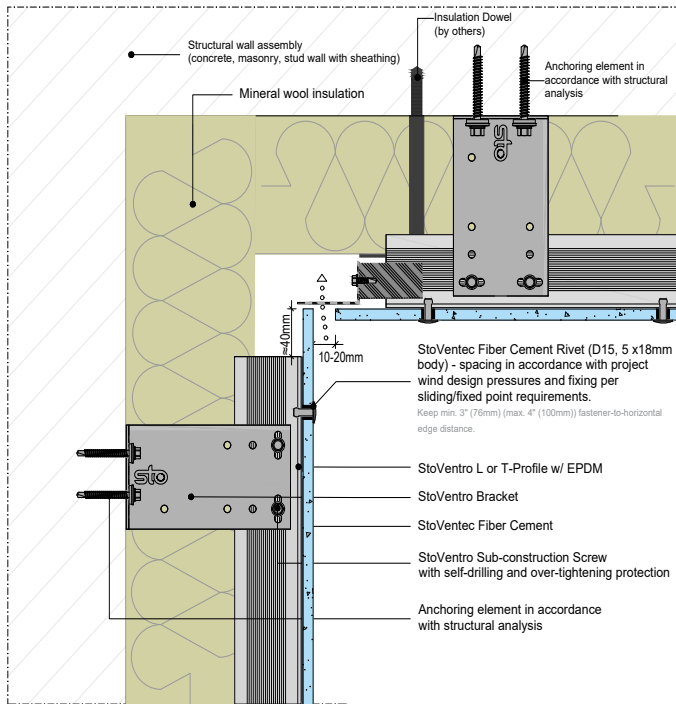
Install the StoVentec Fiber Cement in the same way as described on pages 25-29 and utilizing SVFC fasteners following edge distance rules and a fixing diagram for design wind loads appropriate for the specific project.

Sto Detail 90.Fc.165 (above) depicts a panel joint perpendicular to the vertical wall with the long dimension of the fiber-cement running parallel to the wall.

Note

If necessary, carry out diagonal bracing in accordance with project-specific engineering.

Transition - wall to soffit: vertical section in longitudinal direction



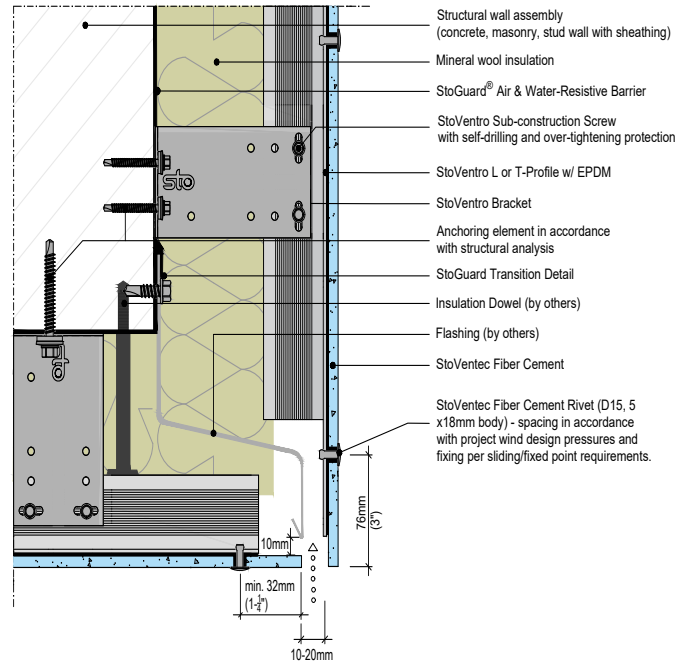
Create the ventilation airspace of 3/8 to 3/4 in. (10-20 mm), which ensures system ventilation. This gap is located between the vertical/wall fiber cement and the horizontal soffit panels. Sto Ventilation Profile may be used to finish the gap. Prior to installing the Ventilation Profile, if desired, spray paint it black

Maintain proper fiber-cement fastener to panel edge distance requirements. Refer to page 25.

Sto Detail 90.Fc.162

Transition - soffit to facade leading upwards: vertical section in longitudinal direction

Note: This detail assumes the soffit panel long dimension runs parallel to the vertical wall. Keep typical minimum fastener-panel edge distances. Refer to the Fiber Cement Design Guide or Installation Guide.



Flashing is needed where soffit panels transition back to vertical walls. Create the ventilation airspace of 3/8 to 3/4 in. (10-20 mm), which ensures system ventilation. This gap is located between the vertical/wall fiber cement and the horizontal soffit panels.

As needed, remove the bracket fastening flange of the vertical T/L-Profiles to enable continuous flashing to project to 10-20mm behind the vertical wall panel(s).

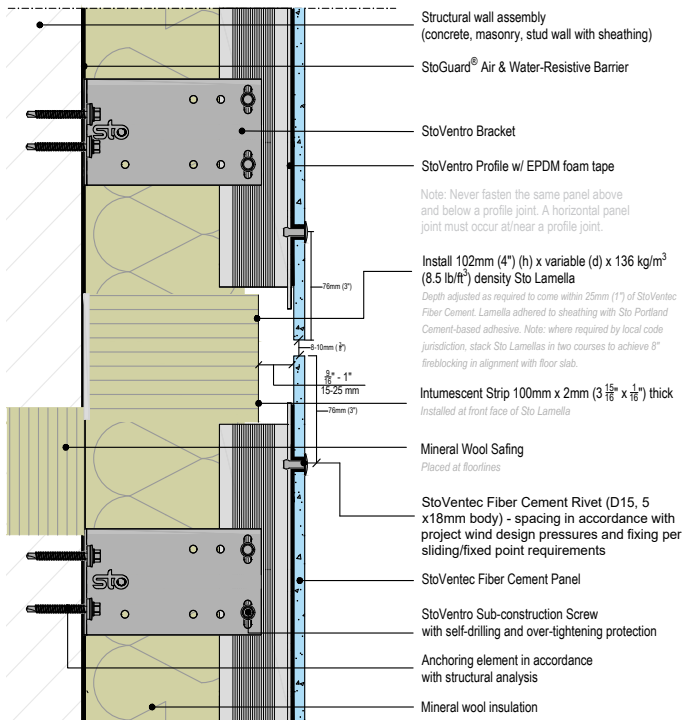
Maintain proper fiber-cement fastener to panel edge distance requirements. Refer to page 25.

Sto Detail 90.Fc.170. Ventilation Profiles (not shown) may be used to finish the air gap between panels.

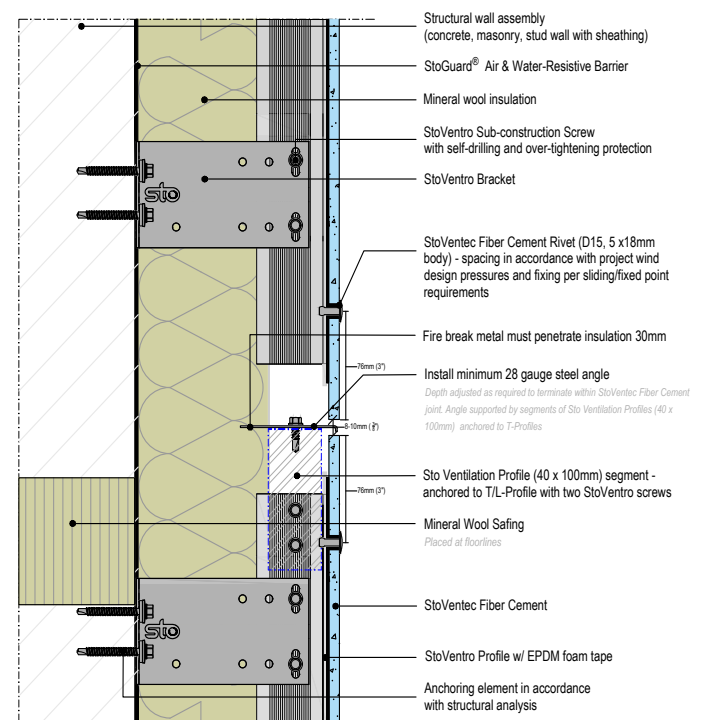


Horizontal fire break

Horizontal fire barrier: floor lines with Sto Lamella firebreak



Horizontal fire barrier: floor lines with metal firebreak



Based on the depth of the cavity between the wall surface and the back of the SVFC, size [Sto Lamella](#) to leave 9/16 to 1 in. (15-25 mm) space between the lamella face and back surface of the fiber-cement panels.

Install the lamella continuously along the floor line, adhering it to the wall with Sto Portland Cement-based adhesive.

Add 2 mm thick adhesive-backed intumescent strip onto the front face of the lamella, covering the entire height/thickness.

Sto Detail 90.Fc.550

Notes

To install fire barriers in ventilated facade constructions, the following building code specifications in their respective current version and issue must be considered:

- NFPA 285 (U.S.)
- CAN/ULC S-134 (Canada)

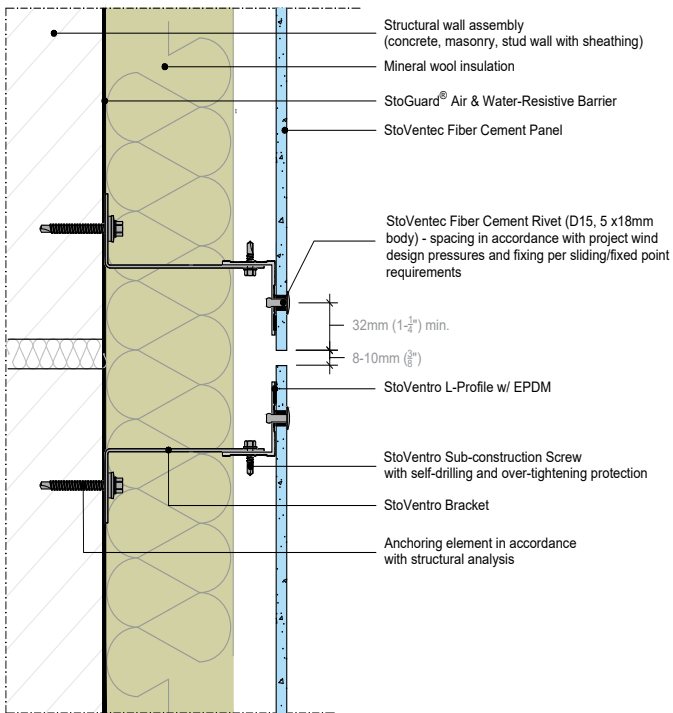
Coordinate the specific execution and location of the fire barriers with the fire protection expert responsible for the construction project.

Alternatively, install minimum 28 gauge metal fire breaks. The metal shall span the cavity and be supported by the base wall, or combine it with ancillary wall brackets mounted horizontally.

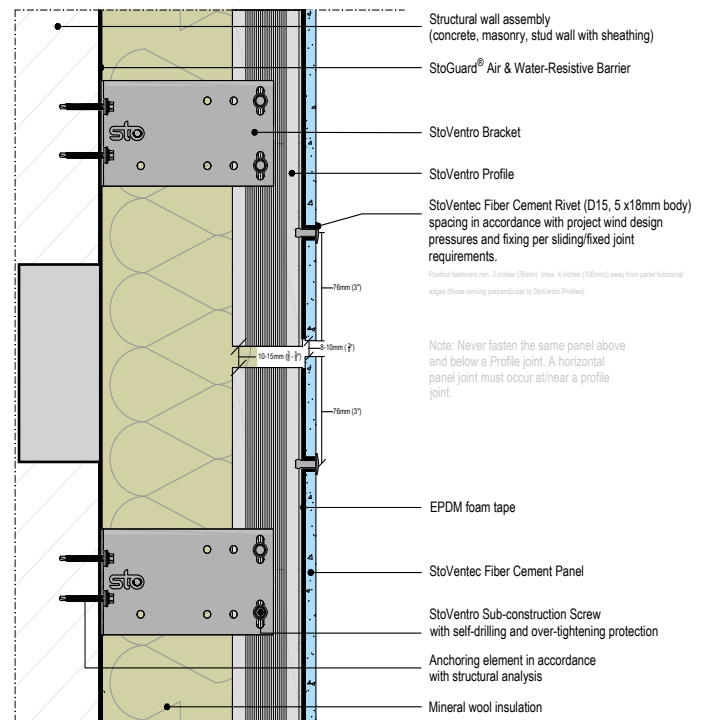
In Sto Detail 90.Fc.555, Sto Ventilation Profile is cut into segments and used to float a continuous metal fire break at the desired height. The Ventilation Profile segment is L-shaped and anchored to the top of T/L-Profiles with two StoVentec screws each. The 28 gauge metal fire break, running continuously across the span of the joint, is fastened to Ventilation Profile every 16 inches (406mm). It penetrates the insulation by 30mm and protrudes into the fiber-cement joint.

System joints - expansion and movement

Building expansion joints (vertical) - plan view



Horizontal joints - section view



Expansion/movement joints (vertical)

- Existing movement joints in back-up wall
- Through-wall joints in back-up wall
- Dissimilar back-up wall construction joints (e.g. frame wall to CMU)
- Fiber-cement panels must not span across a building's expansion/movement joints
- Secure panel edges on L-Profiles adjacent to both sides of the movement joint, keeping a typical $\frac{3}{8}$ in. (8-10mm) gap between panels
- Observe typical fastener-to-panel-edge distance requirements (see p. 25)

Sto Detail 90.Fc.390

Expansion/movement joints (horizontal)

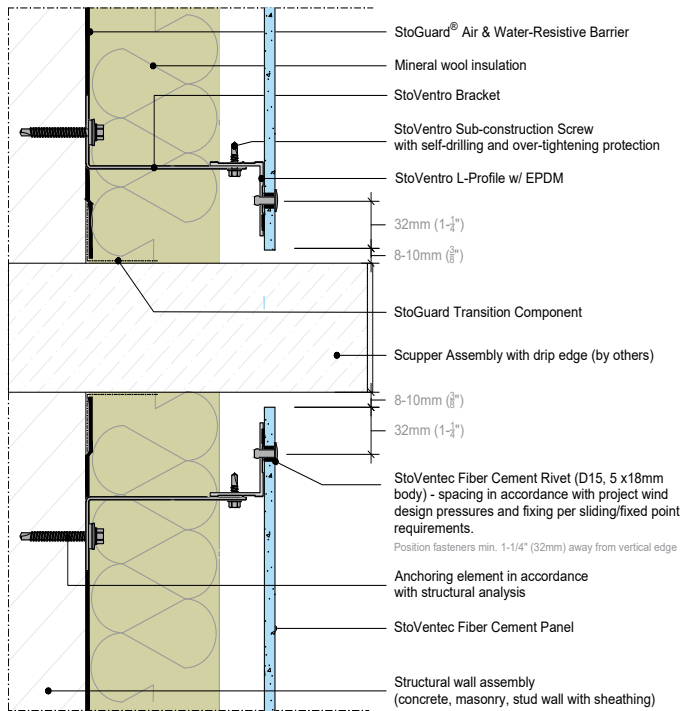
- Integrate structural expansion joints into the SVFC system. Adapt the joint width to suit the expected deformations.
- At system joint locations, the entire system, including the sub-construction, must be completely separated.
- Locate a profile joint at floor framing so that brackets and profiles are separated by floor levels with a $\frac{3}{8}$ to $\frac{5}{8}$ in (10-15mm) min. gap between profile ends
- Do not span over the profile joint with fiber-cement panels, keeping panel separation of $\frac{3}{8}$ in. (10mm) or more
- Observe typical fastener-to-panel-edge distance requirements (see p. 25).

Sto Detail 90.Fc.035

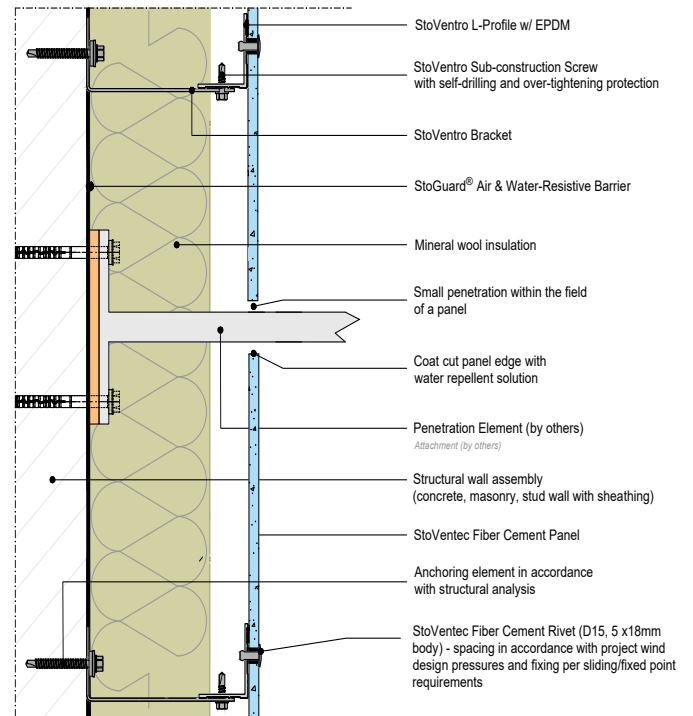


Penetrations

Scupper penetration - plan view



Small penetrations- plan view



Treat larger penetrations such as scuppers similar to a window or other opening.

Sto Detail 90.Fc.300.

Holes for known wall penetrations can be cut in advance via professional fabrication with CNC machinery (best option).

Sto Detail 90.Fc.330.

Cleaning and Maintenance

Cleaning - Before and After Installation

It is critical to keep pre-finished fiber-cement clean during and after the fabrication processes as well as immediately following installation. Fiber-cement dust binds to finished surfaces and cannot be removed easily once exposed to weather. Remove dust after any cutting, drilling or sanding using vacuuming and a clean microfiber cloth but do not scrub.

After installation, wash the facade using low-pressure water spray. If needed, add mild household cleaners (solvent-free) to the water spray. Test the solution in a small inconspicuous area to verify unintended damage or adverse effects are not produced before using it at scale. Do not allow the panels to dry with cleanser solutions applied and always thoroughly rinse the washed areas with clean water, from high to low, so as not to leave any residue.

Periodically wash the installed cladding as above to remove dirt, dust, pollen, and other natural deposits.

High-pressure cleaning may cause panel damage and is not recommended for fiber-cement facades.

Efflorescence, Algae and Mildew Removal

Refer to [Sto Specification No. RC100 - Guideline Specifications for Cleaning Wall Surfaces](#).

Maintenance in the Vicinity...

Regular maintenance in the immediate vicinity of installed fiber-cement is important to the cladding's long-term performance and appearance. Keep plants and vegetation clear from contact with the facade with clearance of one foot or more. Maintain ground clearance of 6 inches for panels at grade by preventing the buildup of landscaping materials such as mulch and stone. Align water sprinklers for landscaping not to spray directly on the facade. Keep gutters, downspouts, scuppers, etc clear to prevent overflow of water onto or behind the facade. Ensure proper drainage around the building base to prevent water pooling at the wall.

Annual Inspection

Annual inspections of the building facade are recommended to identify any potential issues such as missing or loose cladding fasteners, damage to panels and visual defects. Surface finishes are important to the long-term durability of fiber-cement. Natural forces of weathering, particularly UV from sunlight on south and west-facing elevations eventually wear down finish coatings. Fiber-cement may be recoated to refresh the original aesthetics or change things up as desired by building owners or occupants.

Refer to the [StoVentec Fiber Cement Fabrication and Maintenance Guide](#) for more information.

Recommended tools

Refer to the [StoVentec® Installation Guide System Toolkit](#) for a complete list of needed tools and other items. It and many other Render-related resources are available at stocorp.com/rainscreen.

