



Building with conscience.

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Sto Guide Specification 9000Sc StoVentro™ Sub-construction

Section 07 05 43 Cladding Support Systems

This guide specification is intended for use by the design/construction professional and any user of Sto products to assist in developing project specifications and to provide guidance on the application of StoVentro™ Sub-construction to vertical above grade exterior wall construction. StoVentro™ Sub-construction is an adjustable, thermally efficient structural system of brackets, rails/profiles, fasteners, and accessories for StoVentec Systems and other rainscreen wall cladding assemblies. Safe and long-lasting, the sub-construction absorbs both the wind loads and dead loads present on the facade. Alongside structural suitability, the design of the sub-construction incorporates corrosion resistance and a reduction in thermal bridging, while also being quick and easy to install. StoVentro Sub-construction incorporates a continuous air and water-resistive barrier, and continuous noncombustible mineral wool insulation with the sub-construction.

This guide specification is intended to be used when specifying an exterior cladding over StoVentro Sub-construction and should not be viewed as a complete source of information about the entire wall assembly. Refer to other manufacturer's system bulletin and product data for additional recommendations and for safety information of their products within the entire wall assembly.

Notes in italics, such as this one, are explanatory and intended to guide the design/construction professional and user in the proper selection and use of materials. This specification should be modified where necessary to accommodate individual project conditions.

PART 1 GENERAL

1.1 SUMMARY

- A. Provide air and water-resistive barrier, continuous noncombustible mineral wool insulation, sub-construction, and exterior code compliant cladding for vertical above grade exterior walls.
- B. Section Includes: Engineered, tested, adjustable, thermally efficient structural system of brackets, rails/profiles, fasteners, and accessories for attachment of exterior {INSERT CLADDING TYPE} cladding as part of a cavity or rainscreen wall assembly.
- C. Related Sections *(add/delete, depending on specific project requirements)*
 - 1. Section 03 30 00: Cast-in-Place Concrete
 - 2. Section 04 22 00: Concrete Unit Masonry
 - 3. Section 04 42 00 - Stone Composite Panels
 - 4. Section 05 40 00 - Cold-Formed Metal Framing
 - 5. Section 06 16 00 - Sheathing
 - 6. Section 07 21 00 - Thermal Insulation
 - 7. Section 07 26 00 - Vapor Retarders
 - 8. Section 07 27 00 - Air Barriers
 - 9. Section 07 42 43 - Stone Composite Wall Panels
 - 10. Section 07 21 13 - Mineral Board Insulation
 - 11. Section 07 21 16 - Blanket Insulation
 - 12. Section 07 27 26 - Fluid-Applied Membrane Air Barriers
 - 13. Section 07 42 13 - Metal Wall Panels
 - 14. Section 07 42 43 - Composite Wall Panels
 - 15. Section 07 42 47 - Fiber Reinforced Concrete Wall Panels
 - 16. Section 07 62 00 - Sheet Metal Flashing and Trim
 - 17. Section 07 92 00 - Joint Sealants

1.2 WALL ASSEMBLY DESCRIPTION

- A. The wall assembly shall include the following components:
 - 1. Substrate: Concrete, masonry, and/or stud wall with sheathing
 - 2. Air and Water-Resistive Barrier
 - 3. Mineral Wool insulation
 - 4. Thermally Efficient Structural Sub-construction for Exterior Cladding
 - 5. Exterior Cladding

1.3 SUBMITTALS

- A. Manufacturer's specifications, details, installation instructions and product data
- B. Manufacturer's standard warranty
- C. Samples for approval as directed by architect or owner
- D. Prepare and submit project-specific shop drawings
- E. Engineering calculations by qualified licensed PE
- F. Prepare and submit project specific shop drawings

1.4 REFERENCES

- A. ANSI/ASHRAE Standards
ANSI/ASHRAE 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings
- B. IECC
International Energy Conservation Code-2021
- C. ASTM Standards
ASTM A1046 Standard Specification for Steel Sheet, Zinc-Aluminum-Magnesium Alloy-Coated by the Hot-Dip Process
ASTM A370 Standard Test Methods and Definitions for Mechanical Testing of Steel Products
- D. EN Standards
EN 755 Aluminium and Aluminium Alloys – Extruded rod/bar, tube and profiles
EN 10346 Continuously Hot-Dipped Coated Steel Products for Cold Forming
- E. NFPA Standards
NFPA 220 Standard on Types of Building Construction
NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components

1.5 DESIGN REQUIREMENTS

NOTE: Coordinate this section with other material specification sections and detail drawings as applicable.

- A. {SPECIFY} is responsible for designing system, including anchorage to structural support and necessary modifications to meet specified requirements and maintain visual design concepts.
- B. Employ registered professional engineer, licensed to practice engineering in jurisdiction where project is located, to engineer layout and fastening of cladding support system to resist wind loads in accordance with applicable building code requirements.
- C. Structural Design: Provide thermally efficient Sub-construction system capable of withstanding effects of load and stresses from dead loads, wind loads, ice loads (if applicable) as indicated on project Structural Notes within the Structural Construction Drawings, and normal thermal movement without evidence of permanent defects of Sub-construction assemblies or components.

1. Wind Load: as indicated on Structural Drawings, acting inward or outward. {insert design wind pressure loads}. Design for allowable deflection in accordance with cladding manufacturer's requirements.
 2. Dead Loads: Design for loading to accommodate support of cladding system specified by related sections and shown on Construction Drawings or Shop Drawings as required by local building code.
 3. Tolerances: Accommodate deflection of structural members, maintain clearance, and prevent load transfer to non-structural elements.
 4. Thermal movements: Design for movement due to cyclic day and night temperatures to not exceed safety factors for fasteners, joints, and components.
- D. Conform with fire-resistive design requirements of {insert hourly fire-resistance rating}
- E. Ventilated Rainscreen Design (if applicable): provide design details for ventilation air movement into the rainscreen through the wall cavity and to move water vapor out.
- F. Joints
1. Provide joints where they exist in the supporting wall construction - at expansion, control, and cold joints, at changes in support construction (e.g., masonry to frame wall), at junctures with dissimilar construction, at different substrates, at floor lines in multi-story wall construction, at changes in building height and other areas of stress concentration
- G. Insulation Thickness
1. Standard Mineral Wool thickness up to 8 inch (203mm).
 2. Custom Mineral Wool thickness available where required by code.
- H. Sub-Construction
1. StoVentro brackets, long-length profiles, and fasteners available in Aluminum and Zn-Al-Mg-coated steel brackets and aluminum profiles as defined herein.
 2. Bracket sizes, heights, spacing, and layout determined by design pressures on the project. See StoVentro Load Tables or contact Sto Corp. for engineering of the system.

1.6 PERFORMANCE REQUIREMENTS

NOTE: For detailed performance, test results and criteria, refer to StoVentro test data and analysis, and cladding manufacturer's data and analysis.

- A. Air and Water-Resistive Barrier
1. Vapor permeable air and water-resistive barrier in compliance with ASTM E2178 allowable air leakage of 0.004 cfm/ft² (0.02 L/s/m²) and ASTM E2357 allowable air leakage of 0.04 cfm/ft² (0.2 L/s/m²)
 2. Water-resistive barrier in conformance with physical requirements of ASTM E2570
- B. Sub-construction attachment system performance: Comply with requirements to resist dead loads and design wind pressures.
- C. Thermal Performance:
1. Non-combustible mineral wool insulation as defined by NFPA 220 in compliance with ASTM E136 and ASTM C612 Type IA, IB, II, III, IVA, or IVB requirements with 0 flame spread and 0 smoke development when

measured in accordance with ASTM E84

2. Wall Assembly effective R-Value (U-Factor): {INSERT R-VALUE (U-0.XXX)}
 3. Full construction wall assembly (sheathing, sub-construction, interior and exterior insulation, air films, etc.) shall be thermally analyzed to ensure compliance with U-value requirement for applicable climate zone(s).
 4. Perform effective R-Value calculations or modeling in accordance with ASHRAE / IECC guidelines.
- D. Sub-construction Material Properties:
1. 3.2mm and 4.2mm, Large (FP) and Small (GP) wall brackets, quality EN AW-6063 T66 aluminum, tolerance in accordance with EN 755-9, or 6005A-T5 aluminum, tolerance in accordance with ASTM A370-19.
 2. 2.0mm, Large (FP) and Small (GP) wall brackets, Grade 80 HSLAS-F or SS + ZM115 coated steel in accordance with ASTM A1046 Type 1 specification, or Grade S550GD (1.0531) + ZMM430 coated steel conforming to EN 10346.
 3. Minimum 2.0mm aluminum alloy T-profiles, L-profiles, or other StoVentro profiles, EN AW-6063 T66 per EN 755-2, or 6005A-T5 with minimum tensile strength of 38 ksi (262 N/mm²) and 6005A-T5 aluminum tolerance in accordance with ASTM A370-19
- E. Fire Break
1. Metal Fire Break - Minimum 0.38mm corrosion resistant metal of sufficient dimension to overlap inner face of carrier board by minimum 10mm (~3/8in)
 2. Composite Fire Break – Sto Lamella – Nominal 8.5 lb/ft³ (136 kg/m³) density, minimum 4 in (~100mm) tall non-combustible mineral wool insulation lamella strip (fibers oriented perpendicular to wall), faced with intumescent tape, nominal 75 lb/ft³ (1200 kg/m³) flexible intumescent material of exfoliated graphite that foams up under influence of pressure and temperature
 3. Dual Barrier Fire Break – Sto Lamella - Nominal 8.5 lb/ft³ (136kg/m³) density, minimum 4 in (~100mm) tall non-combustible mineral wool insulation lamella strip (fibers oriented perpendicular to wall), cut for compression fit between vertical T-Profiles, and combined with metal fire break, minimum 0.38mm corrosion resistant metal of sufficient dimension to overlap inner face of carrier board by minimum 10mm (~3/8in), faced with minimum 50mm (2in) tall intumescent tape

1.7

QUALITY ASSURANCE

A. Manufacturer Requirements

1. Air and water-resistive barrier manufacturer for a minimum of thirty-five (35) years
2. Minimum 5 years' experience specializing in the manufacturing of façade attachment/support framing similar to those specified.
3. Ability to demonstrate conformance to design requirements through testing or analysis.

B. Installer Requirements

1. Engaged in application of similar systems for a minimum of three (3) years
2. Employ skilled mechanics who are experienced and knowledgeable in curtain wall and rainscreen wall application, and familiar with the requirements of the specified work
3. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with specifications and details for the project

- C. Engineering Qualifications: Registered professional engineer experienced in the design of curtain wall systems, anchors, fasteners and licensed to practice engineering in the jurisdiction where project is located.
- D. Pre-Construction/Mock-up Meeting:
 - 1. Construct full-scale mock-up of typical air/water-resistive barrier and exterior cladding /window wall assembly in accordance with provisions of Division 01, manufacturer's instruction, and requirements of project specifications. Where mock-up is tested at job site maintain approved mock-up at site as reference standard. If tested off-site accurately record construction detailing and sequencing of approved mock-up for replication during construction. Establish sequence and scheduling of work and interface with other trades.
- E. Inspections
 - 1. Provide independent third-party inspection where required by code or contract documents
 - 2. Conduct inspections in accordance with code requirements and contract documents

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product. Store cartons and bundles of material inside in a dry area until ready for use on pallets. Store off the ground on pallets in a dry location out of direct sunlight during installation.
- B. Store cartons and bundles of material inside in a dry area until ready for use on pallets. At the job site store off the ground on pallets in a dry location out of direct sunlight.
- C. Store wet products (pail products) in a dry area and protect from extreme heat, 90°F (32°C), freezing, and direct sunlight

1.9 PROJECT/SITE CONDITIONS

- A. Deliver all materials in their original sealed containers bearing manufacturer's name and identification of product
- B. Store sub-construction, fasteners and accessory products in a dry location off the ground out of direct sunlight
- C. Provide supplementary heat for installation of sub-construction in temperatures less than 25°F (-3.8°C)
- D. Provide a secure staging area for storage of sub-construction components to protect from damage from construction activities
- E. Provide protection of surrounding areas and adjacent surfaces from application of products

1.10 COORDINATION/SCHEDULING

(The work in this section requires close coordination with related sections and trades. Sequence work to provide protection of construction materials from weather deterioration)

- A. Provide site grading such that the wall cladding assembly terminates above cladding manufacturer's requirements.
- B. Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuously connected air and moisture barrier

- C. Provide protection of rough openings before installing windows, doors, and other penetrations through the wall
- D. Schedule work such that the air and water-resistive barrier is exposed to weather no longer than 180 days
- E. Install window and door head flashing immediately after windows and doors are installed
- F. Install diverter flashings wherever water can enter the wall assembly to direct water to the exterior
- G. Install sheet metal flashing and trim closures at terminations with windows, doors, and similar through wall penetrations
- H. Attach penetrations at pre-determined locations and through prefabricated holes in the wall cladding to structural support and provide watertight seal to air and moisture barrier and the cladding.
- I. Install sub-construction after air and water-resistive barrier is completely dry
- J. Install fire breaks at floor lines, openings, and other required locations
- K. Install continuous insulation between or over sub-construction
- L. Install sill flashings, copings, jamb closures, and sealant immediately after installation of the finished wall assembly

1.11

WARRANTY

- A. Provide manufacturer's system warranty for a period of ten years from date of substantial completion covering: Sto Air & Water-Resistive Barrier (AWRB), StoVentro Sub-construction, StoVentec Facade Finish
- B. Provide manufacturer's system warranty for a period of fifteen years from date of substantial completion covering: Sto Air & Water-Resistive Barrier (AWRB), StoVentro Sub-construction, StoVentec Facade Finish (contingent on use of manufacturer's Engineering and Shop Drawing Services)

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide air and water-resistive barrier, sub-construction, and insulation from single source manufacturer or approved supplier.
- B. The following are acceptable manufacturers:
 - 1. Sto Corp. – StoVentro™ sub-construction components

2.2 AIR AND WATER-RESISTIVE BARRIER

Note: Select any of the listed joint treatment/rough opening protection/detail component options and top coat with one of the listed air and water-resistive barrier coatings

- A. StoGuard®
 - 1. Joint Treatment, Rough Opening Protection, and Static Transition Detail Components:
 - a. Sto Gold Fill® – ready mixed coating applied by trowel or knife for rough opening protection of frame walls and joint treatment of sheathing when used with StoGuard Mesh. Also used as a detail component with StoGuard Mesh to splice over back flange of starter track, flashing, and similar ship lap details
 - b. Sto AirSeal™ with StoGuard Fabric and RediCorners – ready mixed coating applied by brush, roller, or spray for joint treatment of sheathing when used with StoGuard Fabric, and rough opening protection of frame walls when used with StoGuard Fabric and RediCorners. Also used as a detail component with StoGuard Fabric to splice over back flange of starter track, flashing, and similar ship lap details
 - c. Sto RapidGuard® – one component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations, and other static transitions in above grade wall construction
 - d. StoGuard Conformable Membrane – self-adhered membrane flashing, rough opening protection, sheathing joint treatment, and transition detailing material
 - 2. Air and Water-Resistive Barrier Coating
 - a. Sto AirSeal® – ready mixed vapor permeable air and water-resistive barrier coating for concrete, concrete masonry, brick masonry, wood-based sheathing, cementitious sheathing, and glass mat gypsum sheathing
 - b. Alternatives:
 - A. Sto Gold Coat® – ready mixed vapor permeable air and water-resistive barrier coating for concrete, concrete masonry, brick masonry, wood-based sheathing, cementitious sheathing, and glass mat gypsum sheathing
 - B. Sto VaporSeal® – fluid-applied Class 1 vapor retarder and air and water-resistive barrier for concrete, concrete masonry, brick masonry, wood-based sheathing, cementitious sheathing, and glass mat gypsum sheathing
 - C. Sto GoldSeal STPE – vapor permeable fluid-applied air and water-resistive barrier for use over glass mat gypsum sheathing, wood-based sheathing, cementitious sheathing, concrete, and concrete masonry wall construction
 - D. StoShield SA VP – self-adhered vapor permeable membrane air barrier and water-resistive barrier for use over prepared vertical above-grade concrete,

concrete masonry, wood sheathing, glass mat gypsum sheathing, and cementitious sheathing

- E. StoShield SA NP - self-adhered vapor impermeable membrane air barrier and water-resistive barrier for use over prepared vertical above-grade concrete, concrete masonry, wood sheathing, glass mat gypsum sheathing, and cementitious sheathing

1. Static or Dynamic Transition Detail Component: sheathing to foundation, dissimilar materials (e.g. CMU to frame wall), wall to balcony floor slab or ceiling, or other detailing in above grade wall construction
 - (a) StoGuard Conformable Membrane – self-adhered membrane flashing, rough opening protection, sheathing joint treatment, and transition detailing material

2.2 INSULATION BOARD

1. Mineral wool insulation board in conformance with ASTM C612, Type IA, IB, II, III, IVA, or IVB requirements, minimum 3.5 lb/ft³ density (56.1 kg/m³), and R-4.2 per inch (RSI - 0.74 per 25mm)
 - a. Minimum 2 inch thickness for construction Types I-IV is required to satisfy code requirements for NFPA 285 with respect to combustible AWRBs.
 - b. Versions with dark facing are available for camouflaging the mineral wool at open panel joints

2.3 FLOOR LINE FIRE STOP

Note: A, B, and C are acceptable alternatives.

- A. Metal fire break
 1. Minimum 0.38mm corrosion resistant metal of sufficient dimension to overlap inner face of carrier board by minimum 10mm (~3/8in)
- B. Composite Fire Break - mineral wool insulation with surface mount intumescent tape:
 1. Sto Lamella mineral wool insulation board in conformance with ASTM C612, Type IV requirements, nominal 8.5 lb/ft³ density (136.2 kg/m³), and R-3.2 per inch (RSI - 0.56 per 25mm) with glass fibers oriented perpendicular to the plane of the wall.
 2. Rolf Kuhn 2mm (~1/16in) ROKU® intumescent strip with adhesive backing (field applied over insulation – refer to Sto Details)
- C. Dual Barrier Fire Break – mineral wool insulation with metal fire break and intumescent tape
 1. Sto Lamella mineral wool insulation board in conformance with ASTM C612, Type IV requirements, nominal 8.5 lb/ft³ density (136.2 kg/m³), and R-3.2 per inch (RSI - 0.56 per 25mm) with glass fibers oriented perpendicular to the plane of the wall.
 2. Minimum 0.38mm corrosion resistant metal of sufficient dimension to overlap inner face of carrier board by minimum 10mm (~3/8in) (field applied over insulation – refer to Sto Details)
 3. Rolf Kuhn 2mm (~1/16in) ROKU® intumescent strip with adhesive backing (field applied over metal fire break – refer to Sto Details)

2.4 SUB-CONSTRUCTION

- A. StoVentro aluminum or coated steel (Zn-Al-Mg) brackets and aluminum T-profiles, L-profiles, and other cross-sectional profiles capable of complying with ANSI/ASHRAE 90.1 and IECC-2021.
- B. Steel Classification: Coated Steel (Zn-Al-Mg)

1. StoVentro Bracket – Zn-Al-Mg, material properties grade – HSLAS-F or SS Gr 80 + ZM 115 or S550GD + ZMM430
- C. Aluminum Classification: Aluminum (ALUM)
1. StoVentro Bracket – ALUM, material properties are 6063-T66 aluminum
 2. StoVentro T-Profile, material properties are 6063-T66 or 6005A-T5 aluminum
 3. StoVentro L-Profile, material properties are 6063-T66 or 6005A-T5 aluminum
 4. StoVentro profiles of other cross-sectional shapes, material properties are 6063-T66, 6063-T6, or 6005A-T5 aluminum
 - a. ½" hat channel
 - b. 1" hat channel
 - c. Agraffe rail
 - d. Carrier rail
- D. Bracket and Rail Spacing: Comply with Professional Engineer's project specific calculations for wall brackets and profiles or pre-engineered and certified designs.
- E. Wall Brackets
1. StoVentro Bracket – ALUM is an aluminum wall bracket. A thermal break accessory is available with the brackets to minimize thermal bridging effects. Brackets range in depth from 40mm to 320mm, in 20mm increments (~1 9/16" - ~12 5/8" in ~13/16" increments). Brackets provide 30mm (~1 3/16") adjustability. Large Brackets (FP) transfer dead loads and wind loads to the primary structure. Small Brackets (GP) transfer only wind loads to the primary structure.
 - a. ALUM FP/GP (choose sizes 40 to 320mm)
 2. StoVentro Bracket – Zn-Al-Mg is a coated steel wall bracket. Zn-Al-Mg brackets range in depth from 25mm to 360mm, in 20mm increments (1" - ~14 3/16" in ~13/16" increments). Zn-Al-Mg brackets are available with spring fingers, for insertion of StoVentro T or L Profiles, beginning at 80mm depth. Brackets provide 30mm (~1 3/16") adjustability. Large Brackets (FP) transfer dead loads and wind loads to the primary structure. Small Brackets (GP) transfer only wind loads to the primary structure.
 - a. Zn-Al-Mg FP/GP (choose sizes 25 to 360mm)
 - b. Zn-Al-Mg with spring finger FP/GP (choose sizes 80 to 360mm)

Note: StoVentro brackets of stainless-steel material were included in NFPA 285 Fire Test and corresponding proprietary Sto Corp design listings. StoVentro ALUM and Zn-Al-Mg brackets were not included in NFPA 285 Fire Test. Contact Sto Corp. for status of design listings for each of these bracket materials and verify conformance of final wall assembly with NFPA 285 acceptance criteria.
- F. Support Profiles are aluminum rails/profiles. The profiles are the supporting sub-construction of the specified wall cladding. StoVentro L-Profiles are acceptable for use where the cladding panel fastener to edge distance design allows, and are also used to stiffen outside corners at cantilevered sections. For camouflaging the aluminum profiles at open cladding panel joints, add black direct-to-metal paint (prior to cladding installation).
1. StoVentro T-Profiles come in lengths of 3m and 6m (~9'-10" and ~19'-7") and have a bearing surface of 90mm (~3 9/16") or 120mm (~4 3/4") Note: 120mm T-Profiles are a special order item only

2. StoVentro L-Profiles come in lengths of 3m and 6m (~9'-10" and ~19'-7") and have a bearing leg surface of 40mm (~1-9/16") and 50mm (2")
3. StoVentro profiles of other cross-sectional shapes required for use in hidden fastener cladding panel attachment or additional face-fastener cladding attachment applications, come in lengths as follows:
 - a. Carrier Rail - 3m (~9'-10").
 - b. Agraffe Rail - 3m (~9'-10").
 - c. Hat Channel: ½" or 1" depth x 8, 10, or 12 foot lengths possible

G. Thermal isolation

1. The optional components may be used with StoVentro Brackets – ALUM, Zn-Al-Mg
 - a. Thermal Blocking Element for ALUM, Zn-Al-Mg StoVentro brackets– 6mm (~¼") thick thermal break accessory that isolates the wall bracket from thermal bridging effects of the primary structure, in two sizes to match the footprint of the large or small bracket.
 - b. Thermal Sliding Element – 1mm (1/32") thick thermal break accessory that isolates the StoVentro 'T'-Profiles, 'L'-Profiles, or other StoVentro profiles from thermal bridging effects of the wall bracket.

Note: Thermal isolation elements were not included in NFPA 285 Fire Test. Contact Sto Corp. for status of design listing for each of these components.

H. Fasteners – profile and bracket connectors

1. StoVentro Sub-construction screw is a self-drilling, hexagonal head stainless steel screw with a hardened drill point and overtightening protection for attachment of StoVentro T-Profiles and StoVentro L-Profiles, or other StoVentro profiles to StoVentro Brackets.
 - a. Size: 5.5mm x 22mm (~3/16" x 7/8"), 500 per box (typical package size)

2.5 FASTENERS

A. Sub-construction attachment to exterior building wall

- a. Attachment to steel studs. StoVentro bracket to steel stud attachment screw is a ¼-14, high drilling capacity, self-drilling, hexagonal head, bi-metal (stainless steel + carbon steel) screw for attachment of StoVentro Brackets to (18g-12ga) steel studs. *Only length of 2" is available from Sto.* The StoVentro bracket to steel stud attachment screw includes an integral stainless steel + EPDM bonded washer of 19/32" diameter. Performance data shall meet:
 - A. Material thickness drill capacity
 - .105" (2.7 mm) carbon steel
 - .125" (3.2 mm) aluminum
 - B. Material Strength
 - Tensile: 3400 lbf / 15124 N
 - Shear 2400 lbf / 10676 N
 - Torsional 140 lbf in / 15.4 N m
 - C. Pull Out Strength
 - 12ga: 1941 lbf / 8634 N
 - 14ga: 1285 lbf / 5716 N

- 16ga: 794 lbf / 3532 N
 - 18ga: 681 lbf / 3029 N
- b. Attachment to concrete, grout-filled CMU, and wood exterior building walls
- A. Contact Sto Corp.

2.6 CLADDING

- A. Refer to Division 07 Section 07 4X XX

2.7 ACCESSORIES

- A. StoSeal STPE Sealant - high-movement, low modulus, non-sag one-component silyl-terminated polyether joint sealant in compliance with ASTM C920 (Type S, Grade NS, Use NT, A, M, Class 100/50) and tested in accordance with ASTM C1382

PART 3 EXECUTION

3.1 ENGINEERING AND SHOP DRAWINGS

- A. Cladding sub-contractor shall provide engineering and shop drawings identifying attachments to back-up wall construction structural supports, location and type of fire breaks, layout of sub-construction components (including fixed or sliding point brackets) and connections (fixed or sliding point), cladding locations and joint spacing, sill flashing, copings, jamb closures, and joint sealant type(s) and location.

3.2 ACCEPTABLE INSTALLERS

- A. Prequalify under Quality Assurance requirements of this specification (section 1.7 B)

3.3 EXAMINATION

- A. Inspect surface plane for compliance with tolerance of not greater than 1/4 inch in 10 feet [6mm in 3.0m] deviation in plane.
- B. Report deviations from the requirements of project specifications or other conditions that might adversely affect the insulation board, sub-construction, or cladding installation to the General Contractor. Do not start work until deviations are corrected.

3.4 SURFACE PREPARATION

- A. Remove surface contaminants, repair cracks, spalls or damage in concrete and concrete masonry surfaces and level concrete and masonry surfaces to comply with required tolerances. Repair holes, gaps, over-driven fasteners in sheathing surfaces, and replace damaged sheathing

3.5 INSTALLATION

NOTE: The air/water-resistive barrier described below is one set of materials in the air barrier system and the moisture protection for the structure. Installation of the air/moisture barrier must be integrated with flashing and other air and moisture barrier materials to ensure that where water is likely to penetrate the wall assembly, it will be drained to the exterior at the source of the leak. Proper air barrier connections and integration of the air/moisture barrier through proper sequencing of work and coordination of trades is necessary for a complete air barrier system and complete moisture protection.

IMPORTANT: Ensure the air/moisture barrier surface, insulation board surface, and reinforced base coat surface are free of surface contamination. Install Sto GPS Insulation Board within 180 days of the application of Sto Gold Coat.

3.6 AIR/WATER-RESISTIVE BARRIER INSTALLATION

- A. Air/Water-Resistive Barrier Installation over Exterior or Exposure I Wood-Based Sheathing (Plywood and OSB), Glass Mat Faced Gypsum Sheathing in Compliance with ASTM C1177, and Concrete, or Concrete Masonry (CMU) Wall Construction
 1. Transition Detailing
 - a. Detail transition areas with Sto RapidGuard or StoGuard Conformable Membrane to achieve air barrier continuity. For illustrations of installation, refer to Sto Guide Details and [Sto RapidGuard Installation Guide](#) or [StoGuard Conformable Membrane Guide](#) (www.stocorp.com).
 2. Rough Opening Protection (select 1, 2 or 3 for frame construction; for concrete or concrete masonry rough openings with wood bucks and similar openings with complex 3-dimensional geometry, select no. 3, Sto RapidGuard):
 - a. Sto Gold Fill with StoGuard Mesh: apply 9 inch (229 mm) wide StoGuard Mesh at rough openings. Immediately apply Sto Gold Fill by spray or trowel over the mesh and spread with a trowel to create a smooth surface that completely covers the mesh (refer to Sto Detail 22s.20M).
 - b. Sto Gold Coat with StoGuard Fabric: apply coating liberally by spray or roller to corners of openings, immediately place StoGuard RediCorners in the wet coating, and apply additional coating over the RediCorners to completely embed them. After all corners have been completed apply coating liberally to the entire rough opening, immediately place StoGuard Fabric in the wet coating, smooth any wrinkles with a brush or roller, and apply additional coating over the fabric to completely embed it. Overlap all seams minimum 2 inches (51 mm). Once completed top coat with additional coating as needed to completely seal the surface. Allow to dry and inspect for pinholes or voids. If pinholes or voids are present, seal with additional coating or Sto RapidGuard (refer to Sto Detail 22s.20F).
 - c. Sto RapidGuard: apply a fillet bead of material with a caulking gun at interior corners inside the opening to seal jamb/sill and jamb/head seams. Apply material in a zig-zag pattern along sill, jambs, and head to form a generous bead of material along the surface to be covered. Use a 6 inch (152 mm) wide plastic drywall knife to spread the material to a uniform thickness of 12-20 mils (0.3-0.5 mm) before the material skins. Treat the entire rough opening surface in this manner and overlap onto the face of the sheathing 2 inches (51 mm) minimum all the way around (refer to Sto Detail 22s.20RG)
 3. Sheathing Joint Treatment (select one)
 - a. Sto Gold Fill with StoGuard Mesh: place 4 inch (102 mm) wide mesh centered along sheathing joints and minimum 9 inch (229 mm) wide mesh centered and folded at inside and outside corners. Immediately apply Sto Gold Fill by spray or trowel and spread with a trowel to create a smooth surface that completely covers the mesh.
 - b. Sto Gold Coat with StoGuard Fabric: apply coating liberally by spray or roller along sheathing joints and immediately place 4 inch (102 mm) wide fabric centered over the joints into the wet coating, and 6 inch (152 mm) wide fabric centered and folded at inside and outside corners into the wet coating. Smooth any wrinkles with a brush or roller and apply additional coating to completely embed the fabric. Overlap

seams minimum 2 inches (51 mm).

- c. Sto RapidGuard: apply to properly installed sheathing - joints butted for gypsum sheathing, and joints gapped for plywood and OSB sheathings (wood-based sheathing typically requires 1/8 inch [3 mm] spacing at edge and end joints). Apply a thick bead of Sto RapidGuard with a caulking gun along sheathing joints or apply in a zig-zag pattern across and down the joints. Spread to a uniform thickness of 20-30 mils (0.5-0.6 mm) before the material skins. Spread 1 inch (25 mm) beyond the sheathing joint on each side. Follow the same procedure for inside and outside corners.
4. Air/Water-Resistive Barrier Coating Installation – Sto Gold Coat® - Substrate-Driven spec (medium and high build specifications are also options)
 - a. Plywood and Gypsum Sheathing: apply the air and moisture barrier coating by spray or roller over sheathing surface, including the dry joint treatment, rough opening protection, and transition areas, to a uniform wet mil thickness of 10-12 mils in one coat (Sto Gold Coat). Use ½ inch (13 mm) nap roller for plywood. Use ¾ inch (19 mm) nap roller for glass mat faced gypsum sheathing. Protect from weather until dry.
 - b. OSB Sheathing: apply the air and moisture barrier coating by spray or with a ¾ inch (19 mm) nap roller to sheathing surface to a uniform wet mil thickness of 20 mils. Touch up any areas with raised OSB strands or voids to provide a void and pinhole free surface. Protect from weather until dry.
 - c. CMU Surfaces:

Repair static cracks up to 1/2 inch (13 mm) wide with Sto RapidGuard. Rake the crack with a sharp tool to remove loose or friable material and blow clean with oil-free compressed air. Apply the crack filler with a trowel or putty knife over the crack and tool the surface smooth. (Note: For moving cracks or cracks larger than ½ inch [13mm]), consult with a structural engineer for repair method). Protect repair from weather until dry.

Liberally apply AWRB coating to the surface with a ¾ inch nap roller or spray equipment to a wet thickness of 20-60 mils, depending on surface condition. Apply to a uniform thickness. Apply one or more additional coats to provide a void and pinhole free surface. Protect from weather until dry.

IMPORTANT: The Sto coating functions as an air and water-resistive barrier on normal weight concrete masonry wall construction with flush (struck flush with the surface of the CMU) or concave joints when minimum two liberal coats are applied. Additional coats may be necessary depending on the condition of the CMU wall surface, CMU porosity, joint profile, and other variables that may exist. For "rough" CMU wall surfaces, skim coat the entire surface with one of Sto's cementitious levelers (Sto BTS Plus or Sto BTS Xtra) before application of coating. A VOID AND PINHOLE FREE SURFACE must be achieved for the coating to properly function as an air and moisture barrier on CMU wall surfaces.

5. Air/Water-Resistive Barrier Connections and Shingle Laps
 - a. Coordinate installation of connecting air barrier components with other trades to provide a continuous airtight membrane.
 - b. Coordinate installation of flashing and other moisture protection components with other trades to achieve complete moisture protection such that water is directed to the exterior, not into the wall assembly, and drained to the exterior at sources of leaks (windows, doors and similar penetrations through the wall assembly).
 - c. Splice-in head flashings above windows, doors, floor lines, roof/sidewall step flashing, and similar locations with StoGuard detail component to achieve shingle lap of the air/moisture barrier such that water is directed to the exterior.

NOTE: Windows and doors are typically installed following installation of the air/moisture barrier and work should be sequenced accordingly. Consult with window manufacturer for installation requirements to maintain air barrier continuity and for head, jamb, sill flashing and perimeter sealant requirements needed to prevent leaks into the wall assembly.

3.7 SUB-CONSTRUCTION INSTALLATION

- A. Install Sub-construction in strict accordance with manufacturer's installation instructions, prescriptive designs, and/or engineering shop drawings.
- B. Install Sub-construction to be level, plumb, and in alignment with building features including corners, off-sets, and penetrations.
- C. StoVentro Wall Brackets and StoVentro T-profile, L-Profile or other StoVentro profiles
 - 1. Mount wall brackets at {16} {24} {32} {48} inches on center horizontally to supporting wall construction as indicated by engineering shop drawings.
 - a. Brackets must be laid out at 1/2-inch increments vertically.
 - b. Tighten screws to structural wall to a snug tight condition and not stripped. Do not over-torque beyond manufacturer's recommendation. If installed using hand tools, verify for each installer at beginning of project using snug-tight criteria. Do not use stripped holes.
 - 2. Attach StoVentro profile to wall brackets in accordance with engineering shop drawings, align plumb and level, and account for irregularities in supporting wall construction.
 - 3. Establish and re-establish and restart bracket locations using laser or chalk-line at penetrations and other obstructions to establish alignment.
- D. Thermally isolate wall brackets, as needed, by inserting thermal isolation materials between wall brackets and substrate.
- E. Attach T-Profiles and L-Profiles, or other StoVentro profiles by use of StoVentro Sub-construction screw through pre-punched holes in the brackets
- F. To cut the aluminum profiles, use a miter saw, electric shears or Dremel rotary tool.
- G. The systems components should not be cut while installed on the building, unless using a shearing instrument.
- H. Provide a 10mm gap between profiles/rails for expansion when multiple lengths of profiles are installed.

3.8 PROTECTION

- A. Provide protection of wall assembly from water damage during and after construction

3.9 ADJUSTING

- A. Inspect and adjust after installation. Replace or repair defective work.
- B. Adjust, and reconfigure as necessary to accommodate cladding system installation. Do not reuse pre-drilled holes unless fastener size is increased.

3.10 SIDING/CLADDING PANEL INSTALLATION

NOTE: Siding/cladding must be installed per manufacturer requirements. {Insert cladding manufacturer installation requirements below}

- A. The cavity must be clear for air flow and free from drainage obstructions.
- B. Attach cladding per manufacturer requirements into StoVentro T-Profiles and L-Profiles, or other StoVentro profiles to meet the wind loads on the project.

ATTENTION

Sto products are intended for use by qualified professional contractors, not consumers, as a component of a larger construction assembly as specified by a qualified design professional, general contractor or builder. They should be installed in accordance with those specifications and Sto's instructions. Sto Corp. disclaims all, and assumes no, liability for on-site inspections, for its products applied improperly, or by unqualified persons or entities, or as part of an improperly designed or constructed building, for the nonperformance of adjacent building components or assemblies, or for other construction activities beyond Sto's control. Improper use of Sto products or use as part of an improperly designed or constructed larger assembly or building may result in serious damage to Sto products, and to the structure of the building or its components. **STO CORP. DISCLAIMS ALL WARRANTIES EXPRESS OR IMPLIED EXCEPT FOR EXPLICIT LIMITED WRITTEN WARRANTIES ISSUED TO AND ACCEPTED BY BUILDING OWNERS IN ACCORDANCE WITH STO'S WARRANTY PROGRAMS WHICH ARE SUBJECT TO CHANGE FROM TIME TO TIME.** For the fullest, most current information on proper application, clean-up, mixing and other specifications and warranties, cautions and disclaimers, please refer to the Sto Corp. website, www.stocorp.com.