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 SPECIFIER NOTE: The information provided below is intended to guide the Consultant in developing specifications for products manufactured by SFS intec (SFS) and should not be viewed as a complete source of information about the product(s). Refer to the Manufacturer's Product Data for additional recommendations and for safety information.

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 SPECIFIER NOTE: This specification includes options and choices within the text. Edit accordingly.

SECTION 07 05 43 CLADDING SUPPORT SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

1. Provide engineered, tested, rainscreen metal framing assembly at exterior walls.

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 SPECIFIER NOTE: SFS intec's NVELOPE Thermally Broken Cladding Support Systems are compatible with a broad range of cladding types, including ACM, Aluminum, Brick Tiles/Slips, Ceramics, Copper, Fibre Cement, Fibre-Concrete, Glassfibre Reinforced Concrete (GRC), Glasfibre Reinforced Plastic (GRP), Glass/Foil, High-Pressure Laminate (HPL), Photovoltaic Cladding, Stucco (Render), Stainless Steel, Terracotta, Timber, Laminated Timber, Stone Veneer, PVC (Weather Boarding), and Zinc. Edit the following paragraphs to suit the project cladding used.

1.2 RELATED SECTIONS

1. Division 03 – Concrete
2. 04 21 13 – Brick Veneer Masonry
3. 04 25 00 – Unit Masonry Panels
4. 04 42 00 – Stone Composite Panels
5. 04 43 00 – Stone Masonry Veneer
6. 06 10 00 – Rough Carpentry
7. 07 42 43 – Stone Composite Wall Panels
8. 07 21 13 – Mineral Board Insulation
9. 07 21 16 – Blanket Insulation
10. 07 25 00 – Weather Barriers.
11. 07 27 26 – Fluid-Applied Membrane Air Barriers
12. 07 42 13 – Metal Wall Panels
13. 07 42 23 – Wood Wall Panels
14. 07 42 26 – Tile Wall Panels
15. 07 42 29 – Terracotta Wall Panels

16. 07 42 43 – Composite Wall Panels
17. 07 42 46 – Cementitious Wall Panels
18. 07 42 47 – Fibre-Reinforced Concrete Wall Panels
19. 07 44 53 – Glass-Fiber-Reinforced Cementitious Panels
20. 07 44 63 – Photovoltaic Cladding
21. 07 46 16 – Aluminum Siding
22. 07 46 21 – Zinc Siding
23. 07 46 33 – Plastic Siding
24. 07 46 46 – Fibre-Cement Siding
25. 07 62 00 – Sheet Metal Flashing and Trim.
26. 07 92 00 – Joint Sealants.
27. 09 24 23 – Cement Stucco

1.3 REFERENCES

1. AA DAF 45 – Designation System for Aluminum Finishes.

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SPECIFIER NOTE: Include the following one reference if extruded aluminum subframing is to receive anodized conversion coating.
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2. AAMA 611 – Voluntary Specification for Anodized Architectural Aluminum.

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SPECIFIER NOTE: Include the following one reference if extruded aluminum sub-framing will be used, and this sub-framing is to receive a powder coated finished.
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3. AAMA 2604 – Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

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SPECIFIER NOTE: Include the following one reference if specifying stainless steel brackets.
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4. ASTM A167 – Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
5. ASTM A653 – Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy with Improved Formability, General Requirements.
6. ASTM B117-19 - Standard Practice for Operating Salt Spray (Fog) Apparatus
7. ASTM C954 – Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
8. ASTM C1513 – Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.

9. ASTM D790-17 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
10. ASTM D792-20 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

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SPECIFIER NOTE: Project Structural Engineer is to confirm use of the following three references as part of criteria for anchoring to building structure.

11. CAN/CSA-A23.3, Annex D – Design of Concrete Structures
12. CAN/CSA-S136 – North American Specification for the Design of Cold-Formed Steel Structural Members
13. CAN/CSA-S304.1 – Design of Masonry Structures.

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SPECIFIER NOTE: Include the following reference if project will pursue LEED certification. Select between New Construction and Core and Shell.

14. Canada Green Building Council – LEEDv4 Canada-BD+C: Green Building Rating System Reference Package [New Construction and Major Renovation] [Core and Shell Development].
15. ISO 179 – Plastics, Determination of Charpy Impact Properties, Part 1: Non-instrumented Impact Test.
16. ISO 527-1 – Plastics, Determination of Tensile Properties, Part 1: General Principles.
17. ISO 1183 – Methods for Determining the Density of Non-cellular Plastics

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SPECIFIER NOTE: Include the following reference if product will be used in project seeking passive house certification through Passive House Canada and the Passivhaus Institut, Germany.

18. Passive House Institute - Criteria for the Passive House, EnerPHit, and PHI Low Energy Building Standard.

1.4 ADMINISTRATIVE REQUIREMENTS

1. Pre-Installation Meeting: Arrange in conformance to requirements of Section 01 31 16, Project Meetings.
 1. Attendance: Contractor, installer, Owner, Consultant, delegated design engineer providing curtain wall system design, manufacturer's technical representative, and those representing related work requested to attend.
 2. Meeting Date: Minimum 2 weeks prior to beginning the work of this Section and work related to Sections affecting the work of this section.
 3. Meeting Location: Project site.
2. Sequencing and Scheduling: Conform to Section 01 32 16, Construction Progress Schedule, for scheduling long lead items to avoid delaying work.

1.5 REGULATORY REQUIREMENTS

1. Design and Structural Properties: Conform to provisions of the National Building Code of Canada as adopted by the Authority Having Jurisdiction over the location of the Work, including modifications made by enactment of provincial, territorial and local laws and regulations regarding building design and construction.

1.6 PERFORMANCE REQUIREMENTS

SPECIFIER NOTE: SFS intec Inc. provides further structural information through their Design Rx program. Please see <https://www.sfsconstructionna.com/nvelope-designrx/> for further information.

1. Structural Design: Provide engineered design capable of withstanding combined effects of stresses from dead loads, wind loads, thermal movement, seismic loads and other anticipated stresses without evidence of permanent defects or failure.
 1. Wind Loads: As indicated in Structural Specifications, acting inward and outward.
 2. Dead Loads: Design for loading to accommodate support of cladding systems specified by related sections and show on Drawings and as required by the building codes enforced by the Authority Having Jurisdiction.
 3. Seismic Loads: Design and size components to withstand seismic loads and sway displacement, and as required by the building codes enforced by the Authority Having Jurisdiction.
 4. SFS intec Inc. Design Rx Program Thermal Simulations Calculator:
 1. <https://www.sfsconstructionna.com/nvelope-designrx/>.
2. Thermal Expansion and Contraction: Design for movement due to cyclic day and night temperatures to not exceed safety factors for fasteners, joints, seals and components.
3. Cladding Accommodation: Design framing support assembly to maintain dimensions to face of cladding materials indicated on Drawings. Design framing supports configuration size, spacing and make adjustments as needed to accommodate support for each cladding type, including:
 1. Unit Masonry Panels, as specified by Section 04 25 00.
 2. Stone Composite Panels, as specified by Section 04 42 00
 3. Stone Composite Wall Panels, as specified by Section 07 42 43
 4. Metal Wall Panels, as specified by Section 07 42 13
 5. Composite Wall Panels, as specified by Section 07 42 43
 6. Fiber Reinforced Concrete Wall Panels, as specified by Section 07 42 47.
 7. Fibre-Cement Siding, as specified by Section 07 46 46.
4. Rain Screen Design: Design ventilating system assembly to accommodate movement of air into the rains screen cavity and to vent our water vapour.
5. Tolerances:
 1. Accommodate deflection of structural members.

2. Maintain clearances at adjacent construction.
3. Prevent load transfer to non-structural elements.
6. Thermal Breaks:
 1. Thermally isolate metal components from each other and support wall.
 1. Maximum contact area between isolator and sheathing: 3.15 in²
 2. Maximum thickness: 0.375 in.
 3. Shims that may be used for plumb and true alignments must not increase thermal isolation contact area.
 2. Thermally isolate fasteners from metal using thermal isolation washers.
 1. Minimum thickness: 0.125 in.
7. Thermal Insulation: As specified in Section 07 21 13.
 1. Design thickness and type of insulation into system assembly.
 2. Perform thermal analysis to determine framing systems effect of wall assembly.
8. Effect on Wall Assemblies Thermal Resistance: Framing system must not degrade complete wall assemblies' thermal resistance by more than 17 percent and conform to building code enforced version of ASHRAE 90.1 prescriptive U-value of wall assembly for the climate zone of the project.
 1. Three-dimensional computer simulated thermal analysis or guarded hot-box test to ASTM C1363-11 results required.
9. Framing system must meet the requirements for awarding the label "Certified Passive House Component" set by the Passive House Institute (PHI).

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SPECIFIER NOTE: Edit the following paragraphs as required by the building's sustainability targets.
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1.7 SUSTAINABILITY CHARACTERISTICS

1. Canada Green Building Council, LEED v 4:
 1. Certification: Refer to Section 01 35 21, LEED Requirements.
2. International Living Future Institute - Living Building Challenge:
 1. Red List Components: Cladding support system must not contain materials, chemicals and elements known to pose serious risks to human health and to the greater ecosystem.

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SPECIFIER NOTE: Include this paragraph if specifying for a project pursuing passive house certification. If paragraph included, cladding system must include additional pre-installed thermal insulation pad AND brackets must be fabricated using SAE 316 stainless steel, and NOT aluminum. (Specify NVS Stainless Steel Bracket + Thermal Pad)

3. Passive House Institute:
 1. Component Accreditation: Cladding support system including brackets and thermal isolators must be a Certified Component in the Façade Anchor Category by the Passive House Institute, Darmstadt, Germany.
 1. X-value:
 1. Fixed Point: 0.0157 W/K
 2. Sliding Point: 0.0082 W/K
 2. Efficiency Criteria: In a typical application, the construction fulfills the following:
 1. Eff.fa: < 0.200 W/(kNK)
 3. Comfort Criteria: Inner surface of wall must be warm enough to prevent mold as well as uncomfortable down-drafts and radiation losses.
 1. Value: $\Theta > 17$ deg. Celsius.

1.8 SUBMITTALS

1. Product Data:
 1. Descriptive product literature describing assembly design, performance and characteristics.
 2. Thermal analysis report indicating assembly U-values for the exterior framing system.
 3. Metal finishes, accessories and components.
2. Shop Drawings:
 1. Submit Shop Drawings for work of this Section in accordance with Section 01 33 00, Submittal Procedures.
 2. Include plans, elevations, framed openings, bearing, details, thermal isolation, fasteners, connectors and anchorage devices, and attachments as needed for project execution. Show size, spacing and location of thermal clips.
 3. Illustrate interface of aluminum assembly with adjacent construction.
 4. Delegated Design Engineer:
 1. Ensure a licensed professional engineer registered in the Province of [...] is responsible for:
 1. Supervision and review of Shop Drawings.
 2. Signing and Sealing each Shop Drawing and associated calculations performed.
3. Samples: Submit two (2) of each component and fastener for system assembly.

4. Design Calculations:
 1. Perform comprehensive analysis of design loads, including dead loads, live loads, wind loads, seismic loads and thermal movement.
 2. Ensure design is supervised and sealed by a licensed professional engineer, registered in the Province of [...].
 3. Test Data: Submit independent test results or engineered analysis for performance signed by an independent agency representative.
5. Manufacturer's Instructions: Include installation instructions, clearances, special procedures and conditions requiring special attention.
6. Installer Qualifications: Submit letter written and signed by manufacturer's agent indicating installer is in good standing and is approved by manufacturer to erect the work related to this Section.
7. Example Warranty Document: Include indicating warranty meets or exceeds provisions specified by this Section.
8. Certificates: Submit in accordance with Section 01 30 00, Submittal Procedures. Submit thermal clip manufacturer's written certification that Products, systems and assemblies have been installed in accordance with manufacturer's requirements.

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SPECIFIER NOTE: Edit the following paragraphs as required by the building's sustainability targets.
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1.9 SUSTAINABLE DESIGN SUBMITTALS:

1. International Living Future Institute - Living Building Challenge: Submit in accordance with Section 1 33 00, Submittal Procedures.
 1. Submit Declare Label for Products as published by the International Living Future Institute:
 1. Indicate I-13 declaration status as LBC Red List Free.
 2. Indicate End of Life Options as 100% Recyclable.
 2. LEED Canada Submittals: Submit in accordance with Section 01 33 00, Submittal Procedures, and Section 01 35 21, LEED Requirements.
 1. Construction Waste Management:
 1. Submit project [Waste Reduction Workplan] [Waste Management Plan] highlighting recycling and salvage requirements.
 2. Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that [75] [50] % of construction wastes were recycled or salvaged.
 2. Materials & Resources
 1. Recycled Content

1. Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-industrial and post-consumer content, and total cost of materials for project.
2. Regional Materials
 1. Submit evidence that project incorporates required percentage [20] [10] % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
3. Passive House Institute: Submit in accordance with Section 01 33 00, Submittal Procedures.
 1. Submit Certified Passive House Component certificate for cool, temperate climate, as issued by the Passive House Institute of Darmstadt, Germany.

1.10 QUALITY ASSURANCE

1. Manufacturer Qualifications:
 1. Document a minimum of 5 years of experience designing and supplying work of this Section.
 2. Maintain technical product representation local to place of the work that is able to meet at project site as required for meetings and inspection of the work.
2. Installer Qualifications:
 1. Trained and authorized by manufacturer as qualified to install work of this Section.
 2. Employ full-time on-site superintendent for foreperson to oversee installation during the work of this Section.
 3. Show examples of successfully completed project of equivalent scope and quality when requested by the Consultant.
3. Delegated Design Engineer:
 1. Employ a licensed engineer carrying professional liability insurance as required by the provincial regulatory body for engineers and is registered in the Province of [...].
4. Mock-Ups:
 1. Provide mock-ups in accordance with Section 01 43 00, Quality Assurance.
 2. Mock up complete system to a minimum of 10 m² (100 ft²) at location as directed by the Consultant.
 3. Provide as required to illustrate substrate, air barrier, insulation, framing, flashing, thermal isolation and treatments at fenestrations, corners and transitions.
 4. Verify mock-up as confirming to manufacturer's instructions and provides of the Contract Documents.
 5. Do not begin work of this Section until after inspection by manufacturer's representative is complete and mock-up has been accepted in writing by the Consultant.
 6. Protect and maintain accepted mock-up as standard of quality for work of this Section.

7. Accepted mock-ups may be incorporated into the work of this Section.

1.11 DELIVERY, STORAGE AND HANDLING

1. Conform to provisions of Section 01 60 00, Product Requirements, and manufacturer's instructions.
2. Ordering: Conform to manufacturer's ordering instructions and lead time requirements to avoid construction delays.
3. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identifications labels intact.
4. Store and handle to keep clean, dry and protected from damage due to weather and construction activities.

1.12 FIELD CONDITIONS

1. Site Environmental Requirements: Do not install materials until site conditions confirm to manufacturer's written instructions.

1.13 WARRANTY

1. Confirm to Warranty requirements specified in Section 01 78 36, Warranties.
2. Manufacturer: Provide 15-year materials warranty covering defective materials of framing system.

1.14 SOURCE QUALITY CONTROL

1. Single Source Responsibility: Furnish engineered design and fabrication by or under direct responsibility of a single manufacturer.
2. Field Measurements:
 1. Verify conditions prior to preparing shop drawings and beginning fabrications.
 2. Verify with dimensions shown on shop drawings and mark corrections prior to installation, when field verification is not possible.

1.15 CONSTRUCTION WASTE MANAGEMENT

1. Comply with Section 01 74 19, Waste Management and Disposal.

PART 2 PRODUCTS

2.1 MANUFACTURERS

1. Manufacturer List: Products of following manufacturers are permitted subject to conformance to requirements of Drawings, Schedules and Specifications:
 1. SFS intec Inc. Website: www.ca.sfs.com. Tele: (905) 847-5400
2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00, Product Requirements.

2.2 SYSTEMS

1. Basis of Design: NV1-System (Vertical Exposed Fastener) thermally-broken rainscreen cladding support system with non-continuous self-shimming [aluminum] [stainless steel] support brackets, extruded aluminum vertical rail profiles and polypropylene copolymer thermal isolators, for use with continuous insulation, by SFS intec Inc.
2. Basis of Design: NV2-System (Vertical Concealed Adhesive-Fixed) thermally-broken rainscreen cladding support system with non-continuous self-shimming [aluminum] [stainless steel] support brackets, extruded aluminum vertical rail profiles, elastic adhesive and tape fastening system, and polypropylene copolymer thermal isolator, for use with continuous insulation, by SFS intec Inc.
3. Basis of Design: NV3-System (Concealed Fastener) thermally-broken rainscreen cladding support system with non-continuous self-shimming [aluminum] [stainless steel] support brackets, extruded aluminum vertical rail profiles, aluminum concealed fastener cladding support hangers, and polypropylene copolymer thermal isolators, for use with continuous insulation, by SFS intec Inc.
4. Basis of Design: NH2-System (Horizontal Exposed Fastener) thermally-broken rainscreen cladding support system adapted from the NV1-Systems, with non-continuous self-shimming, 6005A T6, aluminum support brackets, extruded [aluminum] [stainless steel] horizontal rail profiles and polypropylene copolymer thermal isolators, for use with continuous insulation, by SFS intec Inc.

SPECIFIER NOTE: The NH3 system is not available with stainless steel brackets.

5. Basis of Design: NH3-System (Horizontal and Vertical Exposed Fastener) thermally-broken rainscreen cladding support system with non-continuous self-shimming aluminum support brackets adaptable to support both horizontal or vertical extruded aluminum rail profiles and polypropylene copolymer thermal isolators, for use with continuous insulation, by SFS intec Inc.
6. Basis of Design: NV8-System (Concealed Hanger) thermally-broken rainscreen cladding support system with non-continuous self-shimming [aluminum] [stainless steel] support brackets, extruded aluminum vertical rail profiles, aluminum horizontal rails, concealed cladding support hanger system secured to the cladding panel, and polypropylene copolymer thermal isolators, for use with continuous insulation, by SFS intec Inc.
7. Basis of Design: NV10-System (Concealed Independent Hanger) thermally-broken rainscreen cladding support system with non-continuous self-shimming [aluminum] [stainless steel] support brackets, extruded aluminum vertical rail profiles, horizontal aluminum carrier rails to support a hanger clip and vertical rail system fabricated and connected off-site to cladding panels, and polypropylene copolymer thermal isolators, for use with continuous insulation, by SFS intec Inc.
8. Basis of Design: NVS + Thermal System (Vertical Exposed Fastener) thermally-broken passive house certified rainscreen cladding support system with non-continuous self-shimming stainless steel support brackets, extruded aluminum vertical rail profiles, aerogel and aluminosilicate ceramic thermal isolator, for use with continuous insulation, by SFS intec Inc.

2.3 MATERIALS

1. Gauge: Provide minimum gauge as required to confirm to design criteria for each assembly unless noted otherwise.

2. Aluminum:
 1. Alloy and Tempering: Aluminum 6005A – T6 as required for rainscreen cladding support and construction.

SPECIFIER NOTE: Edit the following coating options as required for the project.

2. Coating:
 1. Finish surfaces of aluminum components to Aluminum Association AA DAF 45, Designation System for Aluminum Finishes.
 1. Designation: AA-25
 2. Colour: [Clear anodized] [Black]
 2. Powder-coat surfaces of aluminum components to AAMA 2604.
 1. Specular Gloss Level: [30 units] [As selected by the Consultant] to ASTM D523
 2. Colour: As selected by the Consultant from the RAL Colour Space System.
3. Stainless Steel:
 1. Alloy: SAE 316 Stainless Steel as required for rainscreen cladding support and construction, unless noted otherwise.

2.4 COMPONENTS

1. Provide components and products of the cladding system and fasteners manufactured and supplied by a single manufacturer.
2. Sub-framing Components:
 1. Wall Brackets:
 1. Provide brackets with [integral thermal isolator and] pre-punched holes to receive a minimum of two (2) wall anchors per bracket.
 1. Single brackets with a height of 75 mm.
 2. Double brackets with a height of 150 mm. Provide pre-punched hole sizes required to accommodate fastener and substrate type.
 2. Provide stem for Connecting Rail to Bracket. Stem must not penetrate exterior layer of insulation. Provide plate thickness of 6.5 mm for use at steel stud and wood frame walls, and 11 mm for concrete or CMU walls.
 1. Small Bracket Dimensions: 3 inches high and 2.5 inches wide.
 2. Large Bracket Dimensions: 6 inches high and 2.5 inches wide.
 3. Pre-punched Holes: For engagement and placement of stainless steel self-tapping hex-head screws for use in attaching to vertical rail.

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SPECIFIER NOTE: Include the following sentence if specifying the NH3 system.
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4. [Pre-cut Slots: For attaching and adjusting horizontal L-rails and for placement of self-tapping hex-head screws in either fixed or sliding adjustable position for use in attaching to horizontal L-rail.]
3. Bracket Depth: As required to offset cladding from exterior wall plane at substrate and to allow for installation of continuous insulation and provision of rainscreen cavity.
 1. Offset Brackets: [40 mm] [60 mm] [90 mm] [120 mm] [150 mm] [180 mm] [210 mm] [240 mm] [270 mm] [300 mm] with available vertical axis adjustment of up to 40 mm.
 2. Align offsets to differing wall plans as shown on Drawings.
4. Approved Product:
 1. NVELOPE [Aluminum] [Stainless Steel] Brackets by SFS intec Inc.
 2. Or approved substitution subject to the requirements of this specification.
2. Vertical Rail: Minimum 2.2 mm thick extruded aluminum.
 1. L-rail for vertical furring members.
 1. Nominal Dimensions: 60 mm leg and 40mm leg
 2. T-section for vertical furring members.
 1. Type:
 1. T60-80 by SFS intec Inc.: 60 mm leg and 80 mm face.
 2. T60-100 by SFS intec Inc.: 60 mm leg and 100 mm face.
 3. T40-100 by SFS intec Inc.: 40 mm leg and 100 mm face.
 4. T60-120 by SFS intec Inc.: 60 mm leg and 120 mm face.
 5. T60-140 by SFS intec Inc.: 60 mm leg and 40 mm face.
 3. U-Section for vertical furring members: Type HBL60-40 by SFS intec Inc.
 1. Nominal Dimensions: 60 mm leg and 40 mm face.
 2. Thickness: 2.5 mm.
 4. Z-Section for vertical furring members: Type Z25-40-30 by SFS intec Inc.
 1. Nominal Dimensions: 25 mm face, 45 mm leg and 30 mm face.
 2. Thickness: 2.4 mm.
 5. Z-Section for vertical furring members: Type Z40-45-55 by SFS intec Inc.
 1. Nominal Dimensions: 40 mm face, 45 mm leg and 55 mm face.
 2. Thickness: 2.4 mm.

6. Tube Section for vertical furring members:
 1. For use with NV10-System by SFS intec Inc.
3. Horizontal Rail: Nominal 2.5 mm thick extruded aluminum.

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SPECIFIER NOTE: Include the following paragraphs if using the NV3 Concealed Fastener system. Delete if not used.

1. Cladding Rail-Carrier Profile: CP-NV3-3000 Horizontal Rail by SFS intec Inc.
 1. Dimensions: 60 mm high and 25 mm deep. Intermittent cleat fixed to cladding panel are mate to horizontal rail. Total depth of 26 mm when engaged.
 2. Attachment: Cleats are factory-punched to accommodate fastener spacing and dimension. Oversize holes to allow for thermal contraction and expansion of rail.

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SPECIFIER NOTE: Include the following paragraphs if using the NV8 Concealed Fastener system. Delete if not used. Confirm either mechanical fastening of hanger to cladding, or structural adhesive.

2. Cladding Rail-Hanger Profile:
 1. Rail: CP-NV8 Horizontal Rail by SFS intec Inc.
 2. Fixing Hanger: As recommended by manufacturer based on application.
 3. Attachment: Rail is factory-punched to accommodate fastener spacing and dimensions. Fixing Hanger [mechanically fastened] [adhered using structural adhesive] to back side of cladding panel.

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SPECIFIER NOTE: Include this component if specifying the NH3 system. Specify whether L-rail or Lipped L-rail is to be used. Delete if not used.

3. Angle Profile: [L-Rail] [Lipped L-Rail]
 1. Nominal Dimensions: 60 mm leg and 40mm leg

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SPECIFIER NOTE: Include this paragraph related to adapters if specifying the NH2-System.

3. Adapters:
 1. Vertical-to-Horizontal Adapter: Extruded aluminum per Manufacturer's recommendations.
 1. Profile: NH2 Vertical to Horizontal Adaptor by SFS intec Inc.
 2. Alloy and Tempering: Aluminum 6005A – T6 as required for rainscreen cladding support and construction

4. Thermal Isolator:

SPECIFIER NOTE: If including thermal isolators, select one from the following two types.

1. Standard Isolator: pre-installed compression resistant, flame retardant pad to improve thermal performance of cladding support assembly and to provide additional galvanic protection.
 1. Material: Injection-molded Polypropylene copolymer.
 2. Size: To accommodate wall bracket plate. Thermal isolators must match support bracket and must not decrease structural performance of system.
 3. Thickness: 3/16 inch (5 mm) thick.
 4. Tensile Strength: 36 N/mm² to ISO 527-1.
 5. Breaking Elongation: 6% to ISO 527-1.
 6. Density: 0.91 g/cm³ to ISO 1183.
 7. Impact Resistance: 90 kJ/m² to ISO 179/1eU
 8. Thermal Conductivity: 0.117 W/m^oK.
 9. Colour: Green.
 10. Approved Product:
 1. Nvelope NV-T1 or NV-T2 Thermal Isolators by SFS intec Inc.
 2. Or approved substitution subject to the requirements of this specification.
2. Thermal Pad: pre-installed compression-resistant pad to improve thermal performance of cladding support assembly.
 1. Material: Aluminosilicate Aerogel Ceramic.
 2. Size: To accommodate wall bracket plate. Thermal isolators must match support bracket and must not decrease structural performance of system.
 3. Thickness: 3/8 inch (10 mm) thick.
 4. Colour: White
 5. Approved Product:
 1. Nvelope Thermal Pad by SFS intec Inc.
 2. Or approved substitution subject to the requirements of this specification.

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SPECIFIER NOTE: Fasteners, connectors and anchors are to be reviewed and confirmed by the cladding Delegated Design structural engineer, and the structural engineer is to make the necessary modifications to this specification.

5. Connectors and Anchors:
 1. Connectors used with Cold-Formed Steel Framing Members: Conform to CAN/CSA-S136.
 2. Screw Fasteners: SAE 304 alloy stainless steel as instructed by manufacturer.
 1. Use thermoset polyester coating that exhibits performance of 1,000 hours without corrosion to ASTM-B117.
 2. Use minimum no. 14 self-drill hex-head screw fastener to attach horizontal rail to vertical rail.
 3. Steel Studs:
 1. Use self-drill hex-head TEK screw fasteners of sufficient length.
 2. Ensure minimum of three threads penetrate steel stud members.
 3. Concrete and Masonry Wall Anchors: Use Mechanical and Adhesive anchors, bolts, nuts and washer to suit application and as required for transference of design loads.
 1. Mechanical Anchors: Expansion type, conforming to CAN/CSA-A23.3.
 2. Adhesive Anchors: Torque Controlled, conforming to CAN/CSA-A23.3.

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SPECIFIER NOTE: Include the following paragraph related to Sika adhesive and tape system only when using the Nvelope NV2 system. Delete if this system is not being specified. SikaTack-Panel System is suitable for bonding ceramic and plastic cladding panels to aluminum substructures. It is comprised of a compatible adhesive, a pressure-applied adhesive tape used to keep panels in place while the compatible adhesive cures, and accessories related to surface prep. Refer to manufacturer's literature from Sika for more information.

6. Cladding Adhesive System: Provide elastic adhesive system for concealed fixing of compatible cladding panels to aluminum vertical subframing rails, consisting of primer, adhesive and fixing tape.

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SPECIFIER NOTE: Edit the following two paragraphs based on the cladding material specified. Refer to adhesive manufacturer's recommendations and delegated design engineer's recommendations, as the porosity of cladding materials can affect the type of adhesive required.

1. Panel Adhesive: Exterior Opaque Panels
 1. Material: One-part gun-applied polyurethane structural adhesive for permanent bonding of cladding panels.
 2. Density: 1.20 kg/litre
 3. Service Temperature Range: -40C to +90C
 4. Application Temperature: Minimum +5C. Maximum +35C for substrate and ambient temperature.

5. Hardness: Shore A 55 to ISO 7619-1.
6. Elongation at Break: >300% to ISO 527-1
7. Tensile Strength: 362 to ISO 527
8. Approved Product
 1. Sika-Tack-Panel Adhesive by Sika Limited
2. Panel Adhesive: Exterior Porous Cement-Based of Enamel Coated Glass Panels
 1. Material: One-component Silicone
 2. Density: 1.40 kg/l
 3. Service Temperature Range: -40C to -150C
 4. Application Temperature: 5C to 40C, ambient temperature.
 5. Hardness: Shore A 38 to ISO 7619-1
 6. Elongation at Break: 450% to ISO 527-1
 7. Tensile Strength: 305 psi to ISO 527
 8. Approved Product
 1. SikaTack Panel-50 by Sika Limited.
3. Panel Fixing Tape:
 1. Material: Closed-cell polyethylene foam solution with pressure-sensitive adhesive.
 2. Colour: Anthracite/Gray
 3. Density: 0.05 g/cm³
 4. Compressive Strength: 0.12MPa to ISO 844
 5. Peel Adhesion: 23 N per 25 mm to FINAT FTM 1
 6. Resistance to Shear: 150 hours to FINAT FTM 8
 7. Service Temperature: -40C to 70C.
 8. Approved Product: SikaTack-Panel Fixing Tape by Sika Limited
4. Panel Fixing Accessories: As recommended by adhesive manufacturer for the cladding material specified.
7. Accessories
 1. Bracing, Furring, Bridging, Plates, Gussets and Clips: Formed sheet steel or fiberglass, thickness as necessary to meet structural requirements for conditions encountered.
 2. Galvanic Protection: Use tapes and other methods as necessary to separate and prevent contact between dissimilar metals.

PART 3 EXECUTION**3.1 EXAMINATION**

1. Verify conditions are ready to receive work of this Section before beginning.
2. Backup Wall: Verify level and plumb, free of defects and conforming to acceptable tolerances for installation of subsequent work.
3. Weather Resistive Barrier: Verify complete, cured and conforming to manufacturer's instructions. Verify fenestrations, transitions, discontinuities, sills and ledgers are flashed and sealed to move moisture to exterior of building as part of the air barrier system.

3.2 PREPARATION

1. Review areas of potential interference and conflicts, and coordinate layout and support-provisions for interfacing work.
2. Adjust and perform work as necessary for plumb and true alignments.
3. Pre-drill concrete or concrete masonry unit substrate to 13 mm (1/2") deeper than anticipated embedment depth of fastener into substrate.
4. Use drill diameter approximately 1.6 mm (1/16") less than screw diameter in accordance with fastener manufacturer's written recommendations.

3.3 INSTALLATION

1. Confirm to manufacturer's instructions and provisions of the Contract Documents.
2. Erect cold-formed rainscreen assembly to level, plumb and in alignment with building features including corners, off-sets and fenestrations.
3. Wall Brackets and Vertical Rails:
 1. Mount wall brackets at 16 inches on center horizontally on support wall at each stud location. Use self-drilling self-tapping screws at metal stud framed walls and expansion or adhesive anchors at concrete and masonry walls.
 1. Lay brackets out at an even 0.5 inch increment vertically or horizontally.
 2. Tighten to snug-tight, approximately 90 in-lbs of torque and as instructed by fastener manufacturer instructions.
 3. Where using snug-tight criteria, verify torque for each installer using hand tools at beginning of project.
 2. Thermally isolate wall bracket attachments by sandwiching thermal isolation material between metal bracket and support wall substrate.
 3. Isolate screw fastener washers using material to thermally isolate fastener heads from metal bracket.
 4. Attach horizontal rail to wall bracket stem by use of a self-tapping screw fastener through the pre-punched holes in the rail and into the pre-punched pilot holes on the bracket.
 5. Isolate horizontal rail from bracket by sandwiching thermal isolation material between rail and bracket stem.

6. Place shims the same size and profile as the isolator between the sheathing and bracket isolator to account for irregularities in support wall.
 7. Establish and re-establish and restart vertical bracket locations using laser or chalk-line at fenestrations and other obstructions to establish horizontal alignments. Place brackets at 0.5 inch increments vertically or horizontally.
4. Horizontal Rail:
1. Space to make suitable bearing surfaces for each cladding system as instructed by manufacturer and as shown on Consultant-reviewed shop drawings.
 2. Begin at bottom and mount to vertical rails using No. 14 self-drilling self-tapping stainless steel screws.
 3. Tighten screws to snug-tight, between 90 and 95 in-lbs of torque. Verify equivalent snug-tight condition for installers using hand tools.
 4. Install successive horizontal rails as required for panel type.
 5. Mount horizontal rails at fenestrations and other openings so that fastening points are as close to the lower and upper edges as possible.
5. Semi-Rigid Mineral Wool Insulation: Install to expand into and tightly fit between wall brackets to make continuous and unbroken insulated face of wall as specified in Section 07 21 13, Mineral Board Insulation.
6. Touch-up shop-applied coatings damaged during handling and installation.
7. Use shearing instruments, such as snips snips and nibblers, for cutting metal framing components. Avoid use of saw, as sparks produced during cutting will damage anti-corrosion coatings. Use of saws require that surrounding metal coatings are protected from sparks.

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SPECIFIER NOTE: Select applicable paragraphs depending on system being installed

8. Cut installed vertical rails to minimum 12 inch length and mechanically attach to at least two separate wall brackets.
9. Cut installed horizontal rails to minimum 12 inch lengths and mechanically attach to at least two separate vertical rails to prevent rotation of rail.
 1. Do not exceed 7.5 inch in length for 16 inch on center spaced studs or 11.5 inch in length for 24 inch on center spaced stud at unsupported space of installed horizontal rails at extend past closest vertical rails.
 2. Do not extend the horizontal rails past vertical rails by more than 3 inches in length at opening jambs, including windows, doors and other fenestrations.

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SPECIFIER NOTE: Include the following paragraph when specifying the NV2-System

10. Install Cladding Adhesive System to Manufacturer's recommendation for cladding material being used.

3.4 ERECTION TOLERANCES

1. Maximum Framing Member Variation from True Position: 1/8 inch.
2. Maximum Framing Member Variation from Plane:

1. Individual Framing Members: Do not exceed 1/8 inch in 10 feet.
2. Accumulative Overall Variation for Wall and Floor System: Do not exceed 1/8 inch.

3.5 FIELD QUALITY CONTROL.

1. Manufacturer's Field Technical Service: Make intermittent and final inspection to verify installation, in conformance to manufacturer instructions and to confirm suitable as framing assembly for subsequent cladding installations.
 1. Confirm snug-tight and fastener sizing.
 2. Confirm framing members installed in correct orientation.

3.6 ADJUSTING

1. Inspect and adjust after installation. Replace or repair defective work.
2. Adjust and reconfigure as necessary to accommodate cladding systems for installations over work of this Section. Do not reuse pre-drilled holes unless fastener size increased.

END OF SECTION 07 05 43