

1 General

1.1 GENERAL REQUIREMENTS

1. Drawings and General Provisions of the Contract, including General Conditions, Supplementary Conditions, and other Division 01 – General Requirements Sections, apply to this Section.

1.2 SUMMARY

1. This Section specifies the requirements for the design, supply, and installation of thermally improved cladding support systems.

1.3 RELATED REQUIREMENTS

1. Other sections of the specification that refer to this Section coordinate the requirements of related sections with its provisions.

1.4 REFERENCE STANDARDS

1. All reference standards specified herein imply the latest edition of the standard.
2. American Society for Testing and Materials (ASTM International):
 1. ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
3. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE):
 1. ASHRAE 90.1 (I-P), Standard 90.1-2022 (I-P Edition) -- Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings (ANSI Approved; IES Co-sponsored)
4. Underwriters Laboratories of Canada (ULC):
 1. CAN/ULC S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
 2. CAN/ULC S114, Standard Method of Test for Determination of Non-Combustibility in Building Materials
 3. CAN/ULC S134, Standard Method of Fire Test of Exterior Wall Assemblies

1.5 DEFINITIONS

1. Continuous Insulation R-Value: Thermal resistance rating of insulation materials measured as a decrease from the Rated R-Value of Insulation as modified by thermal bridges, fasteners, penetrations, and openings through the opaque surface of the building envelope.
2. Rated R-Value of Insulation: Thermal resistance rating of primary insulation materials using values as specified by the manufacturer of insulating materials; added to any insulation contained in framing cavities or insulated sheathing materials, but not including thermal resistance contributed by other building materials or air films.

1.6 ADMINISTRATIVE REQUIREMENTS

1. Pre-Construction Meetings: Conduct a pre-construction meeting at Project site in accordance with Section 01 31 19 – Project Meetings attended by the Contractor, Subcontractor. The Consultant and other relevant personnel before commencement of Work for this Section, to review methods and procedures related to thermally improved cladding support systems including, but not limited to, the following:
 1. Approaches to shop drawings and other required submittals and coordination required to align specified building cladding system expectations with design principles listed in this Section.
 2. Sequence and scheduling for installation of thermally improved cladding systems and coordination for preparation of substrates.

3. Review methods and procedures related to installation, including manufacturer's written instructions for installation of thermally improved cladding support systems.
4. Identify any concerns for substrate conditions that could affect manufacturer's installation requirements for thermally improved cladding support systems.
5. Review temporary protection measures required during and after installation.
2. Coordination: Coordinate the Work of this Section with installation of sheathing systems and air and vapour membranes for layout and attachment to structural substrates.
3. Sequencing: Sequence work so that installation of thermally improved cladding systems and support framing coincides with installation of substrate preparation without causing delay to the Work.

1.7 SUBMITTALS

1. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
2. Action Submittals: Provide the following submittals before starting any work of this Section:
 1. Product Data: Submit product data for each type of thermally improved cladding support product specified, including manufacturer's written preparation requirements and installation instructions.
 2. Shop Drawings: Submit shop drawings cladding support systems, required coordination of fastening and attachment of cladding and façade materials, panel layout and accessories.
3. Informational Submittals: Provide the following submittals during the course of the Work:
 1. Certifications:
 1. Qualification Certification: Submit qualification statement or certificate stating that fabricator and installer of thermally improved cladding support systems are approved by the cladding manufacturer and have the necessary tools, equipment, and expertise to undertake the work specified in this Section.
 2. Compliance Certification: Provide certificates from panel and thermally improved cladding support systems manufacturer indicating tested performance requirements required by Authorities Having Jurisdiction (AHJ) for flame spread performance, compatibility of materials and wind load resistance.

1.8 QUALITY ASSURANCE

1. Qualifications: Provide proof of qualifications when requested by Consultant, and as follows:
 1. Manufacturer: Obtain materials from a source having resources to design thermally improved cladding support systems compatible with the cladding products specified in related requirements.
 2. Installers: Execute Work of this Section using qualified personnel skilled in installation of work of this Section, having experience with installations similar in material, design, and extent to that indicated for this project.
 3. Design Engineer: Retain a professional engineer; registered in the province of the Work, to design fabrication and erection of the Work of this Section in accordance with the British Columbia Building Code (BCBC) and Contract Documents requirements including the following:
 1. Seal and signature to shop drawings and design submittals.
 2. Site review and certification of installed components.
 3. Manufacturer's Engineering Recommendations: Perform design calculations for stiffness and load bearing capacity for thermally improved cladding support system in accordance with written recommendations from panel manufacturer for deflection and attachment requirements.
 4. Verify system and panel thicknesses based on maximum deflections provided by panel manufacturer and to suit building location and configuration.

1.9 DELIVERY, STORAGE AND HANDLING

1. Delivery and Acceptance Requirements: Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
2. Storage and Handling Requirements:
 1. Store and handle products in strict compliance with manufacturer's written instructions and recommendations.
 2. Protect from damage due to weather, excessive temperature, and construction operations.

1.10 SITE CONDITIONS

1. Site Measurements: Verify dimensions by site measurements before fabrication and indicate measurements on shop drawings where specified products are indicated to fit together with other construction; coordinate fabrication schedule with construction progress to avoid delaying the Work.
2. Established Dimensions: Establish dimensions and proceed with fabricating specified products without site measurements where site measurements cannot be made without delaying the Work; coordinate construction to ensure that actual dimensions correspond to established dimensions; allow for shimming and fitting.

1.11 WARRANTY

1. Manufacturer's Warranty: Provide manufacturer's standard ten (10) years warranty against defects in material or workmanship starting from the date of Substantial Performance of the Work.

2 Products

2.1 MANUFACTURERS

1. Acceptable Products Manufacturers: Subject to compliance with requirements specified in this Section, use any of the following listed manufacturers' products in accordance with Section 01 61 00 – Common Product Requirements, provided required product data and shop drawings are submitted before starting any work of this Section:
 1. Cascadia Clip by Cascadia Windows and Doors.
 2. ISO Clip by Northern Facades.
 3. NVELOPE Rain Screen Support Systems by SFS.
 4. Rain Screen Attachment System by Knight Wall Systems.
 5. TAC Thermal Spacer System by Exterior Technologies Group.
 6. TClip by Engineered Assemblies.
2. Substitutions: Additional manufacturers offering similar products to Acceptable Products Manufacturers listed above may be incorporated into the work, provided they meet the performance requirements established by the named products and provided they submit requests for substitution in accordance with Section 01 25 00 – Substitutions Procedures.

2.2 PERFORMANCE REQUIREMENTS

1. Regulatory Requirements: Provide panels that are listed and labelled in accordance with CAN/ULC S102, CAN/ULC S114 and CAN/ULC S134 for fire endurance and flame spread testing.
2. Design Responsibility: Professional engineer retained by thermally improved cladding support system manufacturer is responsible for designing support assembly and confirming panel thicknesses and connections based on design loads appropriate for the project and verifying that installation meets requirements of the AHJ.

3. System Description: Plans, elevations, details, characteristics, and other requirements indicated are based upon materials and details are not intended to limit selection of cladding support systems to a single manufacturer, and as follows:
 1. Provide a system that has no visible fasteners, telegraphing or fastening on the exposed panel faces or other components that detract from a neat and flat finished appearance.
 2. Provide a system that does not place restraints on panel that could result in compressive skin stresses for panel products, and that will maintain a flat panel appearance regardless of temperature change.
 3. Listing of Acceptable Products is not intended to denote support for these systems or exclude other systems from being proposed for substitution; engineered assemblies not forming a part of a proprietary system will also be considered.
 4. Selection of thermally improved cladding support systems is a joint coordination effort between the building cladding manufacturer and fabricator of thermally improved cladding support systems.
4. Thermal Improvement Requirements: Design thermally improved cladding support system to provide a measurable improvement when compared to conventional thermal performance of full-depth cladding support systems as follows:
 1. Design thermally improved cladding support systems to provide Continuous Insulation R-Value, retaining a minimum of 80% Rated R-Value indicated for opaque wall areas.
 2. Design thermally improved cladding support system to account for thermal movement of local climate with a minimum of 60°C ambient or cladding panel temperature fluctuations, without causing undue stress on fasteners or panel or other detrimental effects.
 3. Design thermally improved cladding support system as a complete system to accommodate structural movement in wall system and between wall system and building structure, without permanent distortion, damage to infill materials, or racking of joints.
 4. Design thermally improved cladding support system members and suspension system to withstand gravity load, live loads and negative loads calculated in accordance with the British Columbia Building Code (BCBC).
5. Ventilation Requirements: Rear ventilated assembly with designed air space at top and bottom of building, at each wall termination, and perimeter of openings to maintain airflow behind cladding panels, and as follows:
 1. Design cavity ventilation to maintain continuous airflow at cladding penetrations and interruptions; do not block vertical airflow at windows, doors, eaves, or at the base of the building.
 2. Design width of ventilation cavity between rear of panels and exterior sheathing to account for building height and floor-to-floor structural offsets.
6. Structural Requirements: Design structural panel supports to provide a minimum $L/300$ deflection stiffness or as required by cladding panel manufacturer; and that limits deflection of cladding panels to a maximum of $L/180$ at other required serviceability limit states established by cladding materials manufacturer and as follows:
 1. Wind Load: Determine wind loads using post disaster importance factors listed in the National Building Code - Alberta Edition (NBC-AE) for deflection and strength, modified by the appropriate exposure, gust and pressure (internal and external) factors in accordance with the National Building Code - Alberta Edition (NBC-AE) structural commentaries.
 2. Deflection Limitation: Maximum deflection listed above is based on system weight plus wind load (positive and negative) loads acting normal to plane of installation under 1 in 50-year sustained wind loading, and as follows:

1. Maximum deflection criteria apply to horizontal plane of system, width, and length, as well as vertical deflection.
2. Provide additional stiffeners and fasteners to prevent excessive deflection.
3. Building Movement: Include provisions to accommodate movement in thermally improved cladding support systems and between cladding panels and building structure where these movements are caused by deflection or movement of building structure.
4. Drainage: Provide for positive drainage to the exterior of all water entering or condensation occurring within the system.

2.3 MATERIALS

1. Closure Protection/Vent Screen: Manufacturer's recommended material comprised of compressible open-cell U/V stabilized polyether polyurethane foam or other screening material that provides the following:
 1. Air Flow: Minimum of 50% free area, thickness to fill ventilation cavity between rear of cladding panels and insulation, inserted at top, bottom, edges and perimeters of penetrations.
 2. Opening Size: Sized to minimize infiltration of air, water, dust, and insects into the cavity space, and allowing drainage of water accumulating within ventilation cavity.
2. Fasteners: Stainless steel fasteners designed to reduce thermal conductivity and that accommodate thermal expansion and contraction without transferring excessive stress to cladding panels.
3. Structural Thermal Break Spacer: Fibre reinforced thermoset plastic, structural thermal break, washers, and bushings, custom-sized to match structural bearing locations, and as follows:
 1. Loading Pressure: Nominal 300 N/mm².
 2. Compressive Modulus: Nominal 10,000 N/mm².
 3. Shear Strength: Nominal 110 N/mm².
 4. Thermal Conductivity: Maximum USI-Value 0.20 W/m²-°K.
 5. Basis-of-Design Product: Armatherm FRR Structural Thermal Break by Armatherm.
4. Thermal Breaks and Separation Strips: EPDM rubber or cork strips as standard to thermally improve cladding support system, and to maintain performance required for thermal improvement indicated above.
5. Supporting Substructure and Girts: Manufacturer's standard system of substructure and girts, thickness based on structural support requirements of thermally improved cladding support system, and as follows:
 1. Steel Girts: Fabricate from galvanized zinc-coated steel meeting requirements of ASTM A653/A653M, having Grade A, Z275 Coating.
6. Finish: Black finished where visible through open joints of cladding system; bare metal in concealed locations and in closed joint systems.
7. Drainage and Air Circulation: Perforate or notch horizontal components to allow for drainage and airflow.
8. Girt locations as determined by thermally improved cladding support manufacturer to align with modular panel fastener spacing based on panel load data.

2.4 FABRICATION

1. Fabricate thermally improved cladding support systems to retain panels and other components to obtain profiles and details indicated on drawings and as indicated in shop drawings.
2. Fabricate components at factory to the greatest extent possible using best shop practices as required by panel manufacturer.

3 Execution

3.1 EXAMINATION

1. Examine areas for compliance with requirements for installation tolerances and other conditions affecting performance of Work.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

1. Install thermally improved cladding support systems in accordance with manufacturer's written instructions, product data and reviewed shop drawings with completed installation secured, free of rattles, distortions, waviness, and protrusions, damaged or chipped components, and as follows:
 1. Install in proper relationship with adjacent materials.
 2. Use termination trims and closures at rough openings to properly transition and enclose wall assembly continuous insulation.

3.3 CLOSEOUT REQUIREMENTS

1. Repairing: Touch-up, repair, or replace damaged products before cladding installation through the date of Substantial Performance of the Work.
2. Cleaning: Clean installed products in accordance with manufacturer's written recommendations.

END OF SECTION