

Thermal isolator clip system

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product specification

Part 1 - General

1.1 Related documents

- A. Drawings and general provisions of the contract, including general and supplementary conditions and division 01 specification sections, apply to this section.

1.2 Section includes

- A. Thermal isolator clip system used to support exterior wall cladding materials [**metal wall panels**] [**brick veneer**] [**CMU veneer**] [**phenolic panels**] [**fiber cement panels**] [**terracotta**] or <insert other exterior wall systems> and comply with code requirements for continuous insulation.
 1. Substrate: [**exterior sheathing over metal stud framing**] [**exterior sheathing over wood stud framing**] [**concrete masonry units (cmu)**] or [**poured concrete**]
- B. Related requirements
 1. Section 054000 "cold formed metal framing" for wall panel support framing.
 2. Section 061600 "sheathing" for exterior wall sheathings and wall sheathing joint and penetration treatments.
 3. Section 072100 "thermal insulation" for building insulation.
 4. Section [**072726 "fluid applied membrane air barriers"**] [**072713 modified bituminous sheet air barriers"**] for air barriers
 5. Section [**074213.16 metal plate wall panels,**] [**074213.13 formed metal wall panels"**,] [**074123.13.19 insulating metal wall panels,**] [**and**] [**07413.23 metal composite material wall panels**] for exterior metal panel cladding
 6. Section [**074646 "fiber cement siding"**] [**074xxx "terracotta cladding"**] for cladding.
 7. Section 076200 sheet metal flashing and trim" for field formed flashing and sheet metal work.
 8. Section 079200 "joint sealants" for sealants.

1.3 Definitions

- A. The fiberglass reinforced polyamide thermal isolator clip: a 40% fiber content polyamide extrusion embedded within an insulated wall and used to maintain the Continuous Insulation (CI) requirements, primarily in a rainscreen exterior wall configuration.

1.4 Pre-installation meeting

- A. Preinstallation conference: conduct conference at [**project site**] <insert location>
 1. Attendees:
 - a. Owner
 - b. Architect
 - c. Installer

- d. Exterior wall panel manufacturer's representative
 - e. Continuous insulation wall panel support system manufacturer's representative
 - f. Installer's whose work interfaces with or affects wall panels including installers of doors, windows, and louvers.
2. Agenda:
- a. Coordination: coordinate panel assemblies with rain drainage, flashing, trim, stud back-up, soffits, and other adjoining work.
 - 1) Review and finalize construction schedule.
 - 2) Verify availability of materials, installer's personnel, equipment, and facilities needed to maintain schedule.
 - 3) Review means and methods related to installation, including manufacturer's written instructions.
 - 4) Examine support conditions for compliance with requirements, including alignment and attachment to structural members.
 - 5) Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affects this work.
 - 6) Review temporary protection requirements for during and after installation of this work.

1.5 Action submittals

- A. Product data: for each type of product specified; include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory necessary for a complete fully functional exterior wall system.
- B. Shop drawings:
 - 1. Submit fabrication and installation layouts of the panel system; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories, and special details.
 - 2. Submit details of the thermal isolator clip, flashing, trim, and other anchorages, to be at full scale.
 - 3. Shop drawings are to be engineering as a complete system to accommodate criteria as specified in related sections for a complete fully functional exterior wall system.
 - 4. Provide signed and sealed shop drawings by a professional engineer licensed in the jurisdiction of the project.
 - 5. Submit for information and review signed and sealed engineering calculations by a professional engineer licensed in the jurisdiction of the project.
- C. Samples: submit samples of thermal isolator clips with fasteners

1.6 Informational submittals

- A. Test and inspection reports: submit test and inspection reports of each product performed by a qualified testing agency.
- B. Sample warranty: submit manufacturer warranty and ensure forms have been completed in owner's name and registered with manufacturer.

1.7 Quality assurance

- A. Manufacturer quality assurance: production at manufacturer shall be certified according to ISO 9001.
- B. Installer qualifications: an entity that employs installers and supervisors who are trained and approved by manufacturer. Same installer qualifications per balance of exterior wall system.

- C. Mock-up: build mockups to set quality standards for materials and execution [**and for pre-construction testing**]
1. Build integrated mockups of exterior wall assembly [**as indicated on drawings**] [**150 sq. ft. (14 sq. m)**] **<insert requirement>**, incorporating backup wall construction, external cladding, thermal isolator clip, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations.
 - a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.
 - b. Include junction with roofing membrane [**building corner condition,**] [**and**] [**foundation wall intersection**].
 - c. If architect determines mockups do not comply with requirements, re-construct mockups and apply air barrier until mockups are approved.
 2. Approval of mockups does not constitute approval of deviations from the contract documents contained in mockups unless architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of substantial completion
- D. Reference standards: exterior assembly including the thermal isolator clip shall comply with requirements of the following referenced standards:
1. Material standards: thermal isolator clip (polyamide block)
 - a. ASTM D256 – Standard test methods for determining the izod pendulum impact resistance of plastics
 - b. ASTM D635 – Standard test method for rate/time of burning for plastics
 - c. ASTM D638 – Standard test method for tensile properties of plastics (Young’s modulus)
 - d. ASTM D638 – Standard test method for tensile properties of plastics (transverse strength)
 - e. ASTM D638 – Standard test method for tensile properties of plastics (elongation at break)
 - f. ASTM D648 – Standard test method for deflection temperature of plastics under flexural load in the edgewise position
 - g. ASTM D696 – Standard test method for coefficient of linear thermal expansion of plastics between –30°C and 30°C with a vitreous silica dilatometer
 - h. ASTM D792 – Standard test methods density and specific gravity (relative density) of plastics by displacement
 - i. ASTM D1238 – Standard test method for melt temperature
 - j. ASTM D1929 – Standard test method for ignition temperature of plastics
 - k. ASTM D2240 – Standard test method for rubber property—durometer hardness
 - l. ASTM D2843 – Standard test method for smoke density and burning
 - m. ASTM D4630 – Standard test method for ash content in plastics - annealing residue (glass fiber content)
 - n. ASTM G155 - Standard practice for operating xenon arc light apparatus for exposure of non-metallic materials – Weathering
 2. Material standards – Thermal isolator clip (aluminum hat channel)
 - a. ASTM B221 – Standard specification for aluminum and aluminum-alloy extruded bars, rods, wire, profiles, and tube
 3. Material standards – Thermal isolator clip (screw)

- a. ASTM B117 – Standard practice for operating salt spray (fog) apparatus – For anti-corrosion coating
- b. ASTM A449 or SAE J429 Gr 5 or equivalent – Standard specification for hex cap screws, bolts and studs, steel, heat treated, 120/105/90 ksi minimum tensile strength, general use
- c. AISI S100 – North American specification for the design of cold-formed steel structural members
- 4. Structural
 - a. ASTM D638 – Standard test method for tensile properties of plastics
 - b. ASTM D695 – Standard test method for compressive properties of rigid plastics
 - c. ASTM D790 – Standard test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials
 - d. ASTM E488 – Standard test methods for strength of anchors in concrete elements
- 5. Air infiltration
 - a. ASTM E 283 - Standard test method for determining rate of air leakage through exterior windows, curtain walls, and doors under specified pressure differences across the specimen
- 6. Water infiltration
 - a. Static Pressure (ASTM E331): No water penetration at a pressure difference of 15.0 psf for 15 minute duration. Water applied at 5 gal/ft²/hr.
 - b. Dynamic Pressure (AAMA 501.1): No water penetration at a positive dynamic pressure equivalent to 15.0 psf for a 15 minute durations. Water applied at 5 gal/ft²/hr
- 7. Hydrothermal
 - a. AAMA PATS-1-XX voluntary specification for extruded polyamide insulating profiles (epip) – sample conditioning of extruded polyamide profiles
- 8. Fire mock-ups testing
 - a. NFPA 285 – Standard fire test method for evaluation of fire propagation characteristics of exterior non-load bearing wall assemblies containing combustible components

1.8 Delivery, storage and handling

- A. Deliver materials to site in manufacturer’s original unopened containers and packaging with labels clearly identifying product name and manufacturer.
- B. Storage and handling: store materials in clean, dry, interior area in accordance with manufacturer’s instructions.
- C. Protect components during transportation, handling, and installation from weather, excessive temperatures and construction operations.
- D. Handle components in strict compliance with manufacturer’s written instructions and recommendations, and in a manner to prevent bending, warping, twisting, and surface damage

1.9 Field conditions

- A. As per requirements of associated section for balance of wall – Project Architect and Specifier to coordinate requirements.

1.10 Warranty

- A. Technoform provides a warranty of 10 years
- B. Provide jointly written warranty by manufacturer and installer, agreeing to correct defects in manufacturing or installation within a 10 year period after date of substantial completion.

Part 2 - Products

2.1 Manufacturer

- A. Product: Thermal isolator clip
 Address: Technoform NA, Inc.
 1755 Enterprise Parkway
 Twinsburg, OH 44087
 Phone: +1 330 487 6600
 Website: <https://www.technoform.com>

2.2 Thermal isolator clip

- A. Fiberglass reinforced polyamide thermal isolator clip with “elco dril-flex” structural screws (or equivalent) and extruded aluminum anchor clip used to support girt system of exterior wall cladding materials. The fiberglass reinforced polyamide thermal isolator clip is used to maintain the Continuous Insulation (CI) requirements for the wall.
1. Fiberglass reinforced polyamide spacer block (ISO 66396-PA 66, GF40, E2C2, S14-080).
 2. Steel: Elco Dril-Flex or SFS Flex 5 self-drilling structural screws; or stainless steel: Elco Bi-Flex or SFS Bi-Metal self-drilling structural screws
 3. Extruded aluminum hat channel

Characteristic	Reference standard	Units	Dry	Wet
Melting temperature	ASTMD3418	F°	497.97	492.31
Density	ASTM D792	lb/in3	1.4245	1.4412
Annealing residue (glass fiber content)	ASTM D630	%	36.75	35.85
Shore hardness d	ASTM D2240	N/A	91	86
Impact strength	ASTM D256	ft-lbs/in2	4.33	6.90
Transverse tensile strength	ASTM D638	lb/in2	13408	9963
Young's modulus	ASTM D638	lb/in2	452988	352210
Elongation at break	ASTM D638	%	5.1	5.9
Heat deflection temperature	ASTM D648	F°	460	468
Thermal expansion coefficient	ASTM D696	K ⁻¹	3.75x10 ⁻⁵	4.38x10 ⁻⁵
Compressive stress	ASTM D695	lb/in2	910639	390539
Flexural stress	ASTM D790	lb/in2	32768	18015
Weathering	ASTM G155	N/A	PASS	PASS
Ignition temperature for plastics	ASTM D1929	N/A	PASS	PASS
Rate of burning and/or extent and time of burning plastics	ASTM D635	N/A	PASS	PASS
Density of smoke from burning or decomposition of plastics	ASTM D2843	N/A	PASS	PASS

2.3 Performance requirements

- A. **Material properties:** 40% glass-filled fiber content; material conditioned as referenced in AAMA PATS-1-XX Voluntary Specification for Extruded Polyamide Insulating Profiles (EPIP) – sample pre-conditioning of extruded polyamide profiles.
- B. Material standards – aluminum
 - 1. ASTM B221 Extruded bars, rods, open shapes; 6063-T6 alloy
- C. Material standards – screw
 - 1. Steel: Elco Dril-Flex or SFS Flex 5 self-drilling structural screws; or stainless steel: Elco Bi-Flex or SFS Bi-Metal self-drilling structural screws
 - a. ASTM B117 - Standard practice for operating salt spray (fog) apparatus – ELCO (Stalguard Coating) or SFS (VistaCorr Coating)
 - b. AISI S100 - North American specification for the design of cold-formed steel structural members (Gr 5 steel)
 - c. ASTM A449 - Standard specification for hex cap screws, bolts and studs, steel, heat treated, 120/105/90 ksi minimum tensile strength, general use – for screw (Gr 5 steel, 304 stainless steel)
- D. Fire testing compliance:
 - 1. Thermal isolator clip is designed to be used with non-combustible mineral wool board insulation.
- E. Structural: provide thermal isolator clip in compliance with ASTM D638, ASTM D695, and ASTM D790 and relevant standards mentioned above to be without permanent deformation or structural failure of thermal isolator clip per the design pressures in criteria established for the project exterior enclosure:
 - 1. Tensile strength – see ‘Section 2.03 – Material Properties’
 - 2. Compressive stress – see ‘Section 2.03 – Material Properties’
 - 3. Flexural strength – see ‘Section 2.03 – Material Properties’
 - 4. Assembly test for shear, tension, and flexural capacity (ASTM E488) for capacity of assembly using ¼" Elco Dril Flex or SFS Flex 5 screws and polyamide block - Refer to ATI Test Report #F1814.-04-106-31 “Bracket Assembly Structural Loading’ for basis of design in gaged stud wall with sheathing.
- F. Air infiltration (ASTM E283): maximum air leakage of not more than 0.06 cfm/sq. ft. when tested at a pressure difference of 6.24 psf.
- G. Water infiltration
 - 1. Static pressure (ASTM E331): no water penetration at a pressure difference of 15.0 psf for 15 minute duration. Water applied at 5 gal/ft²/hr.
 - 2. Dynamic pressure (AAMA 501.1): no water penetration at a positive dynamic pressure equivalent to 15.0 psf for a 15 minute durations. Water applied at 5 gal/ft²/hr
- H. Assembly fire testing: provide assembly testing of entire exterior wall assembly complying with NFPA 285 “Intermediate Scale Multistory Fire Test”. Components tested and assembly shall be comprised of all elements intended for the Project.
 - 1. Subject to approval of the Authority Having Jurisdiction (AHJ), an Engineering Judgment may be prepared, signed and sealed by a professional Fire Protection Engineer licensed to practice in the project jurisdiction indicating that the assembly shall comply with NFPA 285 based on previously tested similar assemblies
- I. System thermal design: thermal isolator clip is a component of a complete continuous insulation system

that mitigates and substantially eliminates any effective thermal bridging. Thermal isolator clip shall not degrade or compromise the thermal value of the insulation system as specified in related sections for the exterior enclosure.

1. Thermal performance of clip assembly: refer to NFRC Therm reports and U Values. Dew point shall be outside of the Air/Water Barrier and exterior to the building
- J. Temperature structural loading can function between minus 55 degrees F to 180 degrees F

2.4 Thermal isolator clip

- A. Fiberglass reinforced polyamide thermal isolator clip with ELCO or SFS (steel or stainless steel) self-drilling structural screws and extruded aluminum hat channel shall be used to mount horizontally or vertically system girt supports.
 1. Thermal isolator clip shall be 4 inches long and have a depth of **[2 inch] [3 inch] [4 inches] [5 inch] [6 inch] [8 inch] <select depth based on insulation thickness>**
 2. Spacing horizontally shall be based on the location of the cold formed structural framing and shall be no less than 16 inches o.c. horizontally to align with standard cold form steel framing construction. Stud framing shall be no less than 18 gauge thickness. If stud spacing is greater, then blocking shall be provided within stud framing and spacing shall be compensated for based on structural requirements and validation by specialty engineer
 3. Blocks attaching to other substrates shall be located approximately 16 inches o.c.. And no less than 1 every 4 sq. ft., or as required by calculation, panel type, and sub-framing system
- B. Vertical spacing shall be based on engineering calculations as determined from material criteria, panel cladding type, sub-girt horizontal or vertical framing requirements, pull out capacities of fastener into substrate, the weight of cladding system and environmental loading (wind, seismic or other) conditions; but 4 inch deep blocks shall be placed typically no less than 1 per 4 sq ft of area.
- C. The basis of design for the system includes a block at a maximum of (1) one every 4 sq. ft., a panel material between 2 psf and 6 psf in weight, vertical or horizontal sub-girt framing to which to attach panel system, 18 gauge metal studs at 16 inches o.c., and a 50 psf windload

2.5 Accessories

- A. Unfaced, mineral-wool board insulation: ASTM C612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E84; passing ASTM E136 for combustion characteristics Nominal density of 4.5 lb/cu. ft., Types IA and IB, R-Value of 4.2 deg F x h x sq. ft./Btu x in. at 75 deg F. Provide one of the following:
 1. "Rainbarrier HD" (Thermafiber Inc.).
 2. "CavityRock (Roxul)"
 3. "JM Rainscreen" by Johns Manville
 4. "Rainscreen Duo Slab" (Rock Wool Manufacturing Co.)
- B. Steel "Elco Dril-Flex" (ELCO) ASTM J429 Gr 5 and ASTM A449 Ductile shank with hardened drill tip or SFS Flex 5 ASTM J429 and ASTM A449 Gr 5 Self-Drilling Screw; Stainless steel: ELCO Bi-Flex ASTM J429 and ASTM A449 with hardened drill tip or SFS Bi-Metal ASTM J429 and ASTM A449 with hardened drill tip.
- C. Extruded aluminum hat channel: aluminum alloy 6063-T6 structural quality aluminum extrusions, with mill finish
- D. Sealants: comply with requirements of division 07 sections "fluid applied air barriers" and "joint sealants" for sealants

- E. Shims: as necessary to accommodate +/- 1/4" in/out tolerance perpendicular to plane of wall. Shims shall be metal full bearing or high impact plastic full bearing between surface of aluminum flange and back of girt/attachment system. Do not use shims between back surface of block and face of wall at Air/Water Barrier.

Part 3 - Execution

3.1 Examination

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Related Sections in which substrates and related work are specified and for other conditions affecting performance.
- B. Verify that sheathing and water resistive air barrier have been installed properly for installation of the thermal isolator clip; so that system installation will allow for proper installation of continuous insulation and exterior panel system
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

- A. Clean substrates of substances that are harmful to bonding of insulation, including removal of projections capable of puncturing water resistive air barrier, or that may interfere with attachment of thermal isolator clip.

3.3 Installation

- A. Install thermal isolator clip in accordance with the manufacturer's written installation instructions for intended application.
- B. Set thermal clip against air barrier with sealant compatible with water resistive air barrier. Shim as required to maintain tolerances for exterior wall system.
- C. Install either Steel Elco Dril-Flex or SFS Flex 5 self-drilling structural screw or Stainless steel: Elco Bi-Flex or SFS Bi-Metal self-drilling structural screw in accordance with manufacturer's instructions. Use a minimum of two (2) fasteners per block in accordance with manufacturer's standard details or as required by engineering analysis.
- D. Fit mineral wool insulation tightly around clips in accordance with manufacturer's instructions and the requirements specified in Section 072100 "Thermal Insulation". Do not over compress insulation. Install insulation continuously and without voids.
- E. Place mineral wool filler in thermal isolator clip recess to maintain continuity of insulation.
- F. Secure girt system in accordance with the wall panel system requirements to aluminum flanges of thermal isolator clip. Utilize Stainless Steel fasteners to comply with system performance requirements. Shim off of face of aluminum hat channel to meet tolerances of exterior wall system.

3.4 Field quality control

- A. Independent special inspection and testing agency: owner will engage an independent special inspection and testing agency to monitor the work and perform field testing required to comply with design criteria and performance criteria
 - 1. Refer to related sections for requirements.
- B. Contractor and subcontractor are required to coordinate and cooperate with independent special inspection and testing agency

3.5 Protection

- A. Protect installed components from damage to facilitate installation of exterior wall system for substantial completion.
- B. Replace damaged components prior to installation of insulation and panels.
- C. Refer to other sections for balance of protection requirements.

End Of Section 074210