Armatherm™ thermal break solutions minimize building energy loss and improve building envelope performance. Since 2011, Armatherm has been working with architects and structural engineers to improve building design details and reduce heat loss due to thermal bridging within the building thermal envelope.

Armatherm solutions can be used anywhere a penetration or transition exists in the building envelope creating a thermal bridge. Solutions to minimize heat loss include balcony, canopy, parapet, masonry shelf angle, cladding/Z-girt connections, and wall-to-foundation transitions. Improve the effective U value of wall and roof assemblies and reduce heat loss by as much as 70 percent while contributing to LEED points. We are a collaborative, design-build partner who can assist in determining the extent of thermal bridging heat loss on building envelope performance including thermal modeling and connection design calculations. We look forward to working with you!

SECTION 07 21 60

STRUCTURAL THERMAL BREAK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section including the following.

1. Structural thermal breaks fabricated from the following material:
   a. Polyurethane. (Armatherm 500-150, 500-200, 500-280)

2. Thermal breaks at the following locations:
   a. Parapets.
   b. Canopies.
   c. Cast in Situ Concrete Balconies.
   d. Curtain wall mullions.
   e. Cladding/façade connections.
   f. Roof penetrations.
   g. Steel column base/concrete footing.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 03 30 00 - CAST-IN-PLACE CONCRETE for coordination with concrete.
2. Section 04 20 00 - UNIT MASONRY for coordination with masonry construction.
3. Section 05 12 00 - STRUCTURAL STEEL FRAMING for coordination with framing.
4. Section 07 21 00 - THERMAL INSULATION for building insulation.
5. Section 07 42 10 – WALL CLADDING SUPPORT for exterior cladding.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions.

B. Schedule: Submit a list of locations where structural thermal breaks are to be used, and the specific product and thickness to be used at each location.

C. Shop Drawings: Submit shop drawings showing details of construction, and relationship of structural thermal break material with adjacent construction including fastening and/or anchorage connection details, Armatherm thermal break material size and thickness.

D. Thermal Design: Wall assembly or interface detail shall meet the ASHRAE 90.1 requirements for continuous insulation and shall not have structural connections (beams, support framing, sub girts, clips) which create thermal bridging. Effective U values of wall, roof and foundation assemblies shall meet or exceed the design requirements per code. Effective U value calculation or modeling shall be performed in accordance with ASHRAE guidelines.

E. Structural Design: Design structural thermal break connections and/or façade attachment support framing using performance requirements and design criteria indicated. Provide comprehensive engineering analysis by a qualified professional engineer.

1.3 QUALITY ASSURANCE

A. Manufacturer: Minimum of 5 years' experience producing similar products.

B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

B. Storage and Handling: Comply with manufacturer's recommendations for storage and handling. Protect from weather damage.

1.5 WARRANTY

A. Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design Manufacturer: Armatherm, 1 Titleist Dr, Acushnet MA 02743. Tel: 844-360-1036. Email: sales@armatherm.com. Web: www.armatherm.com.

2.2 POLYURETHANE THERMAL BREAKS

A. Structural Thermal Break Material: Armatherm 500-150 high-strength, polyurethane with the following attributes:

1.	Compressive Strength:	ASTM D1621	560 psi.
2.	Compressive Modulus:	ASTM D1621	18,130 psi.
3.	Shear Strength:	ASTM C273	167 psi.
4.	Thermal Conductivity:	ASTM C518	0.32 BTU in/ hr sf degree F.
5.	Coefficient of Thermal Expansion:	ASTM E831	33 x 10e-6 in/in/degree F.
6.	Thermal Resistance (R value):	ASTM C518	3.3 hr sf degree F/ BTU.

7. Accessories: Armatherm FRR bushings and washers as applicable to location. Armatherm washers shall be minimum 0.25 inch thick. Armatherm bushing and washer to provide thermal break between steel washer/bolt and internal structural steel.

NOTE: Select thermal break material thickness as required to suit project requirements.

8. Thickness: [As indicated on the Drawings.] [[2] [4] [6] [10] [12] inches.]

B. Structural Thermal Break Material: Armatherm 500-200 high-strength, polyurethane with the following attributes:

1.	Compressive Strength:	ASTM D1621	1,131 psi.
2.	Compressive Modulus:	ASTM D1621	29,000 psi.
3.	Shear Strength:	ASTM C273	257 psi.
4.	Thermal Conductivity:	ASTM C518	0.40 BTU in/ hr sf degree F.
5.	Coefficient of Thermal Expansion:	ASTM E831	25 x 10e-6 in/in/degree F.
6.	Thermal Resistance (R value):	ASTM C518	2.5 hr sf degree F/ BTU.

7. Accessories: Armatherm FRR bushings and washers as applicable to location. Armatherm washers shall be minimum 0.25 inch thick. Armatherm bushing and washer to provide thermal break between steel washer/bolt and internal structural steel.

NOTE: Select thermal break material thickness as required to suit project requirements.

8. Thickness: [As indicated on the Drawings.] [[2] [4] [6] [10] [12] inches.]

C. Structural Thermal Break Material: Armatherm 500-280 high-strength, polyurethane with the following attributes:

1.	Compressive Strength:	ASTM D1621	2,233 psi.
2.	Compressive Modulus:	ASTM D1621	49,312 psi.
3.	Shear Strength:	ASTM C273	310 psi.
4.	Thermal Conductivity:	ASTM C518	0.45 BTU in/ hr sf degree F.
5.	Coefficient of Thermal Expansion:	ASTM E831	25 x 10e-6 in/in/degree F.
6.	Thermal Resistance (R value):	ASTM C518	2.22 hr sf degree F/ BTU.

7. Accessories: Armatherm FRR bushings and washers as applicable to location. Armatherm washers shall be minimum 0.25 inch thick. Armatherm bushing and washer to provide thermal break between steel washer/bolt and internal structural steel.

NOTE: Select thermal break material thickness as required to suit project requirements.

8. Thickness: [As indicated on the Drawings.] [[2] [4] [6] [10] [12] inches.]

D. Structural Performance: Exterior steel to interior steel or any structural connection that bypasses the continuous insulation. Provide structural thermal break material and connections capable of withstanding and/or transferring the following design loads:

1. Shear, moment and wind loads as indicated.
2. Design structural thermal break to allow for fabrication and construction tolerances, accommodate live load deflection, shrinkage and creep of the building structure and other building movements as required by (applicable building code). Maintain structural steel deflections per AISC 360.
3. Specify type of Armatherm 500 material and allowable load capacity based on manufacturer's data.

E. Thermal Performance – Column Base Insulation Blocks: Effective R values of floor shall meet or exceed the design requirements per code. Effective R value calculation or modeling must be done in accordance with the IACSC "Energy Modeling Guideline for Cold Storage and Refrigeration Warehouse Facilities", Table 4.4.1-1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install thermal breaks in accordance with manufacturer's instructions and approved submittals and the following:

1. Install in proper relationship with adjacent materials.
2. Include accessory products including bushings and washers.
3. Protect from damage until acceptance.

END OF SECTION