Fi-Foil Company, Inc. December 2023

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Product Guide Specification

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) 3-Part Format, including *MasterFormat, SectionFormat,* and *PageFormat,* as described in *The CSI Construction Specifications Practice Guide.*

This section must be carefully reviewed and edited by the Architect to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the Drawings. Delete all “Specifier Notes” after editing this section.

Section numbers and titles are based on *MasterFormat 2020 Update.*

1. 07 21 53

REFLECTIVE BUBBLE INSULATION

Specifier Notes: This section covers Fi-Foil “RetroShield System” reflective bubble insulation intended for use in roofs and walls. Consult Fi-Foil Company, Inc. for assistance in editing this section for the specific application.

* 1. GENERAL
		1. SECTION INCLUDES
			1. Reflective bubble insulation.
		2. RELATED REQUIREMENTS

Specifier Notes: Edit the following list of related sections as necessary. Limit the list to sections with specific information that the reader might expect to find in this section, but is specified elsewhere.

* + - 1. Section 06 11 00 – Wood Framing.
			2. Section 07 26 00 – Vapor Retarders.
			3. Section 07 27 00 – Air Barriers.
			4. Section 09 22 13 – Metal Furring.
		1. REFERENCE STANDARDS

Specifier Notes: List reference standards used elsewhere in this section, complete with designations and titles.

* + - 1. ASTM C 447 – Standard Practice for Estimating the Maximum Use Temperature of Thermal Insulations.
			2. ASTM C 727 – Standard Practice for Installation and Use of Reflective Insulation in Building Constructions.
			3. ASTM C 1224 – Standard Specification for Reflective Insulation for Building Applications.
			4. ASTM C 1338 – Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
			5. ASTM C 1363 – Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
			6. ASTM D 638 – Standard Test Method for Tensile Properties of Plastics.
			7. ASTM D 3310 – Standard Test Method for Determining Corrosivity of Adhesive Materials.
			8. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
			9. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials.
			10. ASTM E 408 – Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
			11. ASTM E 2599 – Standard Practice for Specimen Preparation and Mounting of Reflective Insulation, Radiant Barrier and Vinyl Stretch Ceiling Materials for Building Applications to Assess Surface Burning Characteristics.
			12. ICC-ES AC 02 – Acceptance Criteria for Reflective Insulation.
		1. SUBMITTALS

Specifier Notes: Edit submittal requirements as necessary. Delete submittals not required.

* + - 1. Comply with Section 01 33 00 – Submittal Procedures.
			2. Product Data: Submit manufacturer’s product data, including installation instructions.
			3. Samples: Submit manufacturer’s samples.
				1. Reflective bubble insulation, minimum 6 inches square.
				2. Clip and pin components.
			4. Manufacturer’s Certification: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.
			5. Sustainable Design Submittals: Submit manufacturer’s sustainable design submittals.
				1. Recycled Content: Certify percentages of pre-consumer and post-consumer recycled content.
			6. Warranty Documentation: Submit manufacturer’s standard warranty.
		1. DELIVERY, STORAGE, AND HANDLING
			1. Delivery Requirements: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
			2. Storage and Handling Requirements:
				1. Store and handle materials in accordance with manufacturer’s instructions.
				2. Keep materials in manufacturer’s original, unopened containers and packaging until installation.
				3. Store materials in clean, dry area indoors.
				4. Protect materials during storage, handling, and installation to prevent damage.
	1. PRODUCTS
		1. MANUFACTURERS
			1. Manufacturer: Fi-Foil Company, Inc., PO Box 800, Auburndale, Florida 33823. Toll Free 800-448-3401. Phone 863-965-1846. Fax 863-967-0137. Website [www.fifoil.com](http://www.fifoil.com). E-mail marketing@fifoil.com.

Specifier Notes: Specify if substitutions will be permitted.

* + - 1. Substitutions: [Not permitted] [In accordance with Division 1].
		1. REFLECTIVE BUBBLE INSULATION
			1. Reflective Bubble Insulation: Fi-Foil “RetroShield System”.
			2. Description:
				1. Multi-layer, double-bubble, reflective bubble insulation.
				2. Thickness: 5/16-inch.

Specifier Notes: Specify facings.

* + - * 1. Facings: [Metalized film on both sides] [Metalized film on one side and white polyethylene on other side].
				2. Edges: Integrated tape tab.
				3. Antioxidants: Contains antioxidants to reduce impact of ultraviolet radiation and oxidation.
				4. Vapor retarder.
			1. Compliance and Approvals:
				1. Compliance: ASTM C 1224.
				2. Evaluated: ICC-ES AC 02.
			2. Testing:
				1. Water Vapor Permeance, ASTM E 96: Less than 1.0 perms
				2. Corrosiveness, ASTM D 3310: No evidence of cracking or pitting.
				3. Pliability, ASTM C 1224: No evidence of cracking or pitting.
				4. Bleeding and Delamination, ASTM C 1224: No evidence of bleeding or delamination.
				5. Mold and Mildew, ASTM C 1338: Pass.
				6. Thermal Performance, ASTM C 1371

Emissivity: 0.05.

Reflectivity: 95 percent.

* + - * 1. Service Temperature, ASTM C 411: Minus 50 degrees F to 250 degrees F.
				2. UV Exposure, ASTM G155: 90% Retention after 4k hrs.
				3. Surface Burning Characteristics, ASTM E 84 and E 2599:

Reflective/Reflective:

Flame Spread Index: Less than 25.

Smoke Developed Index: Less than 50.

Classification: Class A.

Reflective/Poly:

Flame Spread Index: Less than 25, Class A.

NFPA 286 Fire Rating – Full Room: Class A.

* + - * 1. Strength Tests, Tensile Strength, ASTM D 638:

MD: 94.3 lbƒ/IN2

TD: 93.0 lbƒ/IN2

10.  Strength Tests, Tear Strength, ASTM D 2261

MD: 5.0 lbƒ/IN2

TD: 6.0 lbƒ/IN2

Compressive Strength, ASTM C 1338 @ 25%: 0.53 lbƒ/IN2

* + - 1. R-Values, ASTM C 1224, ASTM C 1363, Include Lower Air Film:
				1. Attached to Bottom of 6-Inch or 8-Inch Purlin:

Heat Flow Down:

Reflective/Reflective: 16.

Reflective/Poly: 12.

Heat Flow Up:

Reflective/Reflective: 4.7.

Reflective/Poly: 4.0.

Heat Flow Horizontal:

Reflective/Reflective: 5.4.

Reflective/Poly: 4.4.

* + 1. ACCESSORIES

Specifier Notes: Delete accessories not required.

* + - 1. Clip-and-Pin Components:
				1. Description: Use with tape tab, reflective bubble insulation for metal building and framing applications to provide secure mechanical connections.
				2. Beam/Bar Joist Clips or “Z”-Clips: For beams, bar joists, or Z-type purlins.
				3. Purlin Clips or “C”-Clips: For C-type purlins.
				4. Angle Clips or “L”-Clips: For sidewalls and floors.
				5. Quick Attach Clips or “Q”-Clips: For beams, bar joists or C-type purlins.
				6. Tube Clips or “U”-Clips: For wood beams or metal beams.
				7. Locking Washers: Aluminum or white to match reflective bubble insulation facing color.
				8. Material: Electro-galvanized steel.

Temper: 1/2 hard.

Thickness: 0.03 inch.

Hardness: 30168

Down Force Required to pull 1” lock washer from clip-pin: 66 lbs.

* + - 1. Polyester PET Tape: ECHO tape PE-M4535 [Silver] [White] or comparable product.
				1. Description: White, polyester PET film coated with cold weather acrylic adhesive.
				2. Width: 1.89 inches.
				3. Thickness: 3.38 mils.
				4. Adhesion: 60 oz/inch width.
				5. Tensile Strength: 20 lbs/inch width.
				6. Surface Temperature: Minus 40 to plus 148 deg F (Minus 20 to plus 40 deg C).
			2. Double Sided Tape: Fi-Foil double sided tape.
				1. Description: 0.5-mil polyester film coated on both sides with 3-mil acrylic adhesive.
				2. Width: 3/4 inch.
				3. Temperature Resistance: Minus 40 degrees F to 200 degrees F (minus 40 degrees C to 93 degrees C).
	1. EXECUTION
		1. EXAMINATION
			1. Examine areas to receive reflective bubble insulation.
			2. Notify Architect of conditions that would adversely affect installation.
			3. Do not begin installation until unacceptable conditions are corrected.
		2. INSTALLATION
			1. Install reflective bubble insulation in accordance with manufacturer's instructions and ASTM C 727.
			2. Install reflective bubble insulation at locations indicated on the Drawings.
			3. Seal joints in reflective bubble insulation with integrated tape tab or with manufacture-approved foil or poly tape.
			4. Replace damaged reflective bubble insulation as directed by Architect.
		3. PROTECTION
			1. Protect installed reflective bubble insulation from damage during construction.

END OF SECTION