

SECTION 07213

PRE-ENGINEERED BUILDING INSULATION

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pre-Engineered Building Insulation for New Construction.
- B. Pre-Engineered Building Insulation for Existing Construction.

1.2 RELATED SECTIONS

- A. Section 13121 - Pre-Engineered Metal Buildings.
- B. Section 13900 - Fire Protection Systems.
- C. Division 15 - Mechanical; Rough-in utilities.
- D. Division 16 - Electrical; Rough-in utilities.

1.3 REFERENCES

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials in Sheet Form (Procedure B).
- C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- D. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- E. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
- F. ASTM C 1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

1.4 DESIGN REQUIREMENTS

- A. Thermal Resistance of Installed System: R-Value of _____.
- B. Insulating system shall have a continuous vapor barrier inside of building purlins, girts, and insulation to provide complete isolation from inside conditioned air.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. [Product Data]: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
- C. Shop Drawings: Indicate locations of connections and attachments, general details, anchorages and method of anchorage and installation.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square or long, representing actual products required for this project.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing product systems specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this section.
- C. Insulation system components to include a ten-year limited material warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products indoors and protect from moisture, construction traffic, and damage.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Thermal Design, Inc., Simple Saver System. P.O. Box 468, 601 N. Main Street, Madison, NE 68748. ASD. Tel: (800) 255-0776 or (402) 454-6591. Fax: (402) 454-2708. Email: sales@thermaldesign.com, www.thermaldesign.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 MATERIALS

- A. Simple Saver System consists of Batt Insulation, Roof Insulation, Wall Insulation, Vapor Barrier Liner Fabric, Thermal Breaks, Straps, and other devices and

components in a proprietary insulation system as follows:

1. Batt Insulation: ASTM C 991 Type 1; preformed formaldehyde-free glass fiber batt conforming to the following:
 - a. Thermal Resistance: R of _____ (RSI of _____).
 - b. Batt Size: Equal to purlin/girt spacing by manufacturer's standard lengths.
 - c. Unfaced.
2. Roof Insulation: Formaldehyde-free fiberglass batt or fiberglass blanket complying with ASTM C 991 Type 1 and ASTM E 84 with a thermal resistance and thickness as follows:
 - a. As indicated on the drawings.
 - b. R-10; 3 inches (76 mm).
 - c. R-11; 3-1/2 inches (89 mm).
 - d. R-13; 4 inches (102 mm).
 - e. R-19; 6 inches (152 mm).
 - f. R-20; 6 inches (152 mm), 3 inches (76 mm) plus 3 inches (76 mm) (two layers).
 - g. R-22; 7 inches (276 mm), 3-1/2 inches (89 mm) plus 3-1/2 inches (89 mm) (two layers).
 - h. R-25; 8 inches (203 mm).
 - i. R-29; 9 inches (229 mm), 6 inches (152 mm) plus 3 inches (76 mm) (two layers).
 - j. R-30; 9-1/2 inches (241 mm), 6 inches (152 mm) plus 3-1/2 inches (89 mm) (two layers).
 - k. R-30; 9-1/2 inches (241 mm).
 - l. R-32; 10 inches (254 mm), 6 inches (152 mm) plus 4 inches (102 mm) (two layers).
 - m. R-35; 11 inches (279 mm), 8 inches (203 mm) plus 3 inches (76 mm) (two layers).
 - n. R-36; 11-1/2 inches (292 mm), 8 inches (203 mm) plus 3-1/2 inches (89 mm) (two layers).
 - o. R-40; 12-1/2 inches (318 mm), 9-1/2 inches (241 mm) plus 3 inches (76 mm) (two layers).
 - p. R-43; 13-1/2 inches (343 mm), 9-1/2 inches (241 mm) plus 4 inches (102 mm) (two layers).
3. Wall Insulation: Formaldehyde-free fiberglass blanket or batt complying with ASTM C 991 Type 1, ASTM E 136 and ASTM E 84 with a thermal resistance and thickness as follows:
 - a. As indicated on the drawings.
 - b. R-10; 3 inches (76 mm).
 - c. R-11; 3-1/2 inches (89 mm).
 - d. R-13; 4 inches (102 mm).
 - e. R-19; 6 inches (152 mm).
 - f. R-25; 8 inches (203 mm).
 - g. R-30; 9-1/2 inches (241 mm).
 - h. R-38; 12 inches (304 mm).
4. Vapor Barrier Liner Fabric: Syseal® type woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene coatings, as follows:
 - a. Product complies with ASTM C 1136, Types I through Type VI.
 - b. Perm rating: 0.02 for fabric and for seams in accordance with ASTM E 96.
 - c. Flame/Smoke Properties:
 - 1) 25/50 in accordance with ASTM E 84.
 - 2) Self-extinguishes with field test using matches or butane lighter.
 - d. Ultra violet radiation inhibitor to minimum UVMAX® rating of 8.

- e. Size and seaming: Manufactured in large custom pieces by extrusion welding from roll goods, and fabricated to substantially fit defined building area with minimum practicable job site sealing.
 - f. Provide with factory double, extrusion welded seams. Stapled seams or heat-melted seams are not acceptable due to degradation of fabric.
 - g. Factory-folded to allow for rapid installation.
 - h. Color:
 - 1) White.
 - 2) Super white.
 - 3) Gray.
 - 4) Black.
 - 5) Silver aspen.
 - 6) Custom color as selected by Architect.
5. Vapor Barrier Lap Sealant: Solvent-based, Simple Saver polyethylene fabric adhesive.
 6. Vapor Barrier Tape: Double-sided sealant tape 3/4 inch (19 mm) wide by 1/32 inch (.79 mm) thick.
 7. Vapor Barrier Patch Tape: Single-sided, adhesive backed sealant tape 3 inches (76 mm) wide made from same material as Syseal® type liner fabric.
 8. Thermal Breaks:
 - a. 1/8 inch (3 mm) thick by 3 inch (76 mm) wide white, closed-cell polyethylene foam with pre-applied adhesive film and peel-off backing.
 - b. Polystyrene Snap-R snap-on thermal blocks.
 9. Straps:
 - a. 100 KSI minimum yield tempered, high-tensile-strength steel.
 - b. Size: Not less than 0.020 inch (0.50 mm) thick by 1 inch (25 mm) by continuous length.
 - c. Galvanized, primed, and painted to match specified finish color on the exposed side.
 - d. Color:
 - 1) White.
 - 2) Gray.
 - 3) Silver Aspen.
 - 4) Custom Color.
 - e. Primed and painted to match specified finish color on the exposed side.
 - f. Color:
 - 1) Black.
 - 2) Custom Color.
 - g. High-tensile-strength stainless steel.
 - h. Woven polyester plastic. Color as selected.
 10. Fasteners:
 - a. For light gage steel: #12 by 3/4 (19 mm) inch plated Tek 2 type screws with sealing washer, painted to match specified color.
 - b. For heavy gage steel: #12 by 1-1/2 inch (38 mm) plated Tek 4 type screws with sealing washer, painted to match specified color.
 - c. For wood, concrete, other materials: As recommended by manufacturer.
 11. Wall Insulation Hangers: Fast-R preformed rigid hangers, 32 inch (813 mm) long galvanized steel strips with barbed arrows every 8 inches (203 mm) along its length.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that building structure including all bracing and any concealed building

systems are completed and approved prior to installing liner system and insulation in the structure.

- B. Correct any unsatisfactory conditions before proceeding.
- C. If conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION - GENERAL

- A. Install pre-engineered building insulation system in accordance with manufacturer's installation instructions and the approved shop drawings.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install in exterior spaces without gaps or voids. Do not compress insulation.
- D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- E. Fit insulation tight in spaces and tight to exterior side of the sealed liner fabric and around mechanical and electrical services within plane of insulation.

3.3 ROOF INSULATION INSTALLATION

- A. Straps:
 - 1. Cut straps to length and install in the pattern and spacings indicated on shop drawings.
 - 2. Tension straps to required value.
- B. Vapor Barrier Fabric:
 - 1. Install vapor barrier fabric in large one-piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
 - 2. Position pre-folded fabric on the strap platform along one eave purlin.
 - 3. Clamp the two bottom corners at the eave and also centered on the bay.
 - 4. Pull the other end of the pleat-folded fabric across the building width on the strap platform, pausing only at the ridge to fasten the straps and fabric in position where plane of roof changes and to release temporary fasteners on the opposite ridge purlins.
 - 5. Once positioned, install fasteners from the bottom side at each strap/purlins intersection.
 - 6. Trim edges and seal along the rafters.
 - 7. All seams must be completely sealed and stapled seams not acceptable.
- C. Insulation:
 - 1. Unpack, and shake to a thickness exceeding the specified thickness.
 - 2. Ensure that cavities are filled completely with insulation.
 - 3. Place on the vapor barrier liner fabric without voids or gaps.
 - 4. Place top layer of insulation over and perpendicular to the purlins without voids or gaps, as roof sheathing is applied.
 - 5. Place thermal block on top of purlins or bottom of purlins for retrofit work, if no other thermal break exists.
 - 6. Place new insulation between purlins at the required thickness for the R-value specified.

- D. Seal vapor barrier fabric to the wall fabric and elsewhere as required to provide a continuous vapor barrier.

3.4 WALL INSULATION INSTALLATION

- A. Insulation:
 - 1. Install thermal break to exterior surface of girts as wall sheathing is applied.
 - 2. (Optional) Install self-sticking foam thermal break to interior surface of girts prior to installation of insulation.
 - 3. Position and secure Fast-R hangers to girts on the inside face of the wall sheathing.
 - 4. Cut insulation to required lengths to fit vertically between girts.
 - 5. Fluff the insulation to the full-specified thickness.
 - 6. Neatly position in place and secure to Fast-R hangers.
 - 7. Ensure that cavities are filled completely with insulation.
- B. Vapor Barrier Fabric:
 - 1. Install vapor barrier fabric in large one-piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
 - 2. Apply the vapor barrier fabric by clamping it in position over eave strap and installing fasteners through the eave strap into each roof strap, permanently clamping the wall fabric between them.
 - 3. Once in position, draw the vapor barrier fabric down over the column flanges to the base angle and install vertical straps along each column and 5 feet 0 inches on center, maximum, fastening to each girt to retain system permanently in place.
 - 4. All seams must be completely sealed and stapled seams not acceptable.
- C. Seal wall fabric to the roof fabric, to the base angle and up the columns to provide a continuous vapor barrier.

3.5 CLEANING

- A. Clean dirt or exposed sealant from the exposed vapor barrier fabric.
- B. Remove scraps and debris from the site.

3.6 PROTECTION

- A. Protect system products until completion of installation.
- B. Repair or replace damaged products before completion of insulation system installation.

3.7 SCHEDULE

- A. Ceiling Insulation general: R-30.
- B. Ceiling Insulation office and shop areas: R-25.

END OF SECTION