

SECTION 07213

PRE-ENGINEERED BUILDING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior liner.
- B. Support strapping.
- C. Thermal insulation.
- D. Thermal break materials.
- E. Fasteners and sealants.

1.2 RELATED SECTIONS

- A. Section 13120 - Pre-Engineered Structures.
- B. Section 13121 - Pre-Engineered Buildings.
- C. Section 13122 - Metal Building Systems.

1.3 REFERENCES

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. HH-I-558B - Insulation, Blocks, Boards, Blankets, Felts, Sleeving (Pipe And Tube Covering), And Pipe Fitting Covering, Thermal (Mineral Fiber, Industrial Type)

1.4 PERFORMANCE REQUIREMENTS

- A. 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:
 - 1. Provide manufacturer's standard details and catalog data demonstrating compliance with referenced standards.

2. Provide installation instructions.

C. Shop Drawings:

1. Submit typical installation details illustrating relationship of insulating materials to surrounding construction.

D. Samples:

1. Insulation.
2. Liner fabric, with extrusion welded seam.
3. Painted steel support straps.

1.6 QUALITY ASSURANCE

A. Provide materials in original manufacturer's packages.

B. Provide on-site training by manufacturer if requested, to ensure proper installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Inspect materials for damage or shortage upon delivery.

B. Store products indoors and protect from moisture, construction traffic, damage, and theft.

1.8 WARRANTY

A. Insulation manufacturer warrants to the Owner that the actual thermal performance of the insulation system will perform at the specified insulation level when properly installed at specified thickness and sealed against air and water vapor infiltration. The manufacturer shall at its option correct any deficiencies of thermal performance or credit to the Owner the percentage of the insulation system material cost equal to the percentage of any deficiency.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Provide insulation, liner fabric, and accessories fabricated by Thermal Design, Inc. P.O. Box 468, 600 N. Main Street, Madison, NE 68748. Telephone 800-255-0776.

B. Substitutions will not be acceptable.

2.2 MATERIALS

A. Insulation:

1. Fiberglass blanket or batt complying with Fed. Spec. HH-I-558B, Form B, Type I.
2. Roof insulation R-value and thickness:
 - a. As indicated on the drawings.
 - b. R-13; 4 inches.
 - c. R-19; 6 inches.
 - d. R-20; 3 plus 3 inches (two layers).
 - e. R-21; 5-1/2 inches (high density fiberglass).
 - f. R-22; 3-1/2 plus 3-1/2 inches (two layers).
 - g. R-25; 3-5/8 inches (high density fiberglass) plus 3 inches (two layers).
 - h. R-25; 8 inches.
 - i. R-26; 5 plus 3 inches (two layers).
 - j. R-28; 3-5/8 inches (high density fiberglass) plus 4 inches (two layers).
 - k. R-29; 6 plus 3 inches (two layers).
 - l. R-30; 6 plus 3-1/2 inches (two layers).
 - m. R-30; 9-1/2 inches.
 - n. R-31; 5-1/2 inches (high density fiberglass) plus 3 inches (two layers).
 - o. R-32; 6-1/2 inches (high density fiberglass) plus 3 inches (two layers).
 - p. R-32; 5-1/2 inches (high density fiberglass) plus 3-1/2 inches (two layers).
 - q. R-32; 6 plus 4 inches (two layers).
 - r. R-33; 6-1/2 inches (high density fiberglass) plus 3-1/2 inches (two layers).
 - s. R-34; 5-1/2 inches (high density fiberglass) plus 4 inches (two layers).
 - t. R-35; 6-1/2 inches (high density fiberglass) plus 4 inches (two layers).
 - u. R-35; 8 plus 3 inches (two layers).
 - v. R-36; 8 plus 3-1/2 inches (two layers).
 - w. R-40; 8-1/2 inches (high density fiberglass) plus 3 inches (two layers).
 - x. R-40; 9-1/2 plus 3 inches (two layers).
 - y. R-43; 8-1/2 inches (high density fiberglass) plus 4 inches (two layers).
 - z. R-43; 9-1/2 inches plus 4 inches (two layers).
 - aa. R-48; 10-1/2 inches (high density fiberglass) plus 3 inches (two layers).

- bb. R-51; 10-1/2 inches (high density fiberglass) plus 4 inches (two layers).
- 3. Wall insulation R-value and thickness:
 - a. As indicated on the drawings.
 - b. R-10; 3 inches.
 - c. R-11; 3-1/2 inches.
 - d. R-13; 4 inches.
 - e. R-15; 3-5/8 inches (high density fiberglass).
 - f. R-16; 5 inches.
 - g. R-19; 6 inches.
 - h. R-21; 5-1/2 inches (high density fiberglass).
 - i. R-22; 6-1/2 inches (high density fiberglass).
 - j. R-25; 8 inches.
 - k. R-30; 8-1/2 inches (high density fiberglass).
 - l. R-30; 9-1/2 inches.
 - m. R-39; 10-1/2 inches (high density fiberglass).
- B. Vapor Barrier Liner Fabric:
 - 1. Woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene film, as specified.
 - 2. Perm rating: 0.025 for fabric and for seams.
 - 3. Flame spread (ASTM E 84): Not more than 25.
 - 4. Smoke density (ASTM E 84): Not more than 50.
 - 5. 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.
 - a. Stapled seams not acceptable.
 - 6. Factory-folded to allow for rapid pull-out on strap support system.
 - 7. Color:
 - a. White.
 - b. Utility white.
 - c. Super white.
 - d. Gray.
 - e. Royal blue.
 - f. Sky blue.
 - g. Mauve.
 - h. Beige.
 - i. Pale yellow.
 - j. Mint green.
 - k. Dark green.
 - l. Black.
 - m. Silver aspen.

- C. Vapor Barrier Lap Sealant: Fast tack solvent-based, synthetic rubber adhesive.
- D. Vapor Barrier Patch Tape: Double stick sealant tape made from same material as liner fabric.
- E. Thermal Breaks:
 - 1. 1/8 inch thick x 3 inch wide white, closed-cell polyethylene foam with pre-applied adhesive film and peel-off backing.
 - 2. Polystyrene snap-on thermal blocks.
- F. Straps:
 - 1. 100 KSI tempered, high-tensile-strength steel.
 - 2. Size: Not less than 0.015 x 3/4 inch x continuous length.
 - 3. Galvanized, primed, and painted to match specified finish color on the exposed side.
 - 4. Color:
 - a. White.
 - b. Gray.
 - c. Sky blue.
 - d. Mauve.
 - e. Beige.
 - f. Pale yellow.
 - g. Mint green.
 - h. Silver aspen.
 - 5. Primed and painted to match specified finish color on the exposed side.
 - 6. Color:
 - a. Black.
 - b. Bronze.
 - c. Royal blue.
 - d. Medium blue.
 - e. _____
 - 7. High-tensile-strength stainless steel.
 - 8. Woven polyester plastic.
- G. Fasteners:
 - 1. For light gage steel: #12 x 3/4 inch plated Tek 2 screws, painted to match specified color.
 - 2. For heavy gage steel: #12 x 1-1/2 inch plated Tek 2 screws, painted to match specified color.
 - 3. For wood, concrete, other materials: As recommended by manufacturer.
- H. Wall Insulation Hangers: "Fast-R" hangers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that building structure and building systems such as electrical conduit to be concealed are completed and approved.
- B. Correct any unsatisfactory conditions before proceeding.

3.2 ROOF INSULATION INSTALLATION

- A. Steel 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. Position pre-folded fabric on the strap platform along one eave purlin.
 - 2. Clamp the two bottom corners at the eave and also centered on the bay.
 - 3. 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 purlin.
 - 4. Once positioned, install fasteners from the bottom side at each strap/purlin intersection.
 - 5. Trim edges and seal along the rafters.
- 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.

3.3 WALL INSULATION INSTALLATION

- A. Insulation:
 - 1. Install thermal break to exterior surface of girts as wall sheathing is applied.
 - 2. Ensure that cavities are filled completely with insulation.
 - 3. Cut insulation to required lengths to fit vertically between girts.
 - 4. Neatly position in place and secure to Fast-R hangers.
 - 5. Fluff the insulation to exceed the specified thickness.

- B. Vapor Barrier Fabric:
 - 1. Apply the vapor barrier fabric by clamping it in position over eave strap.
 - 2. Once in position, install fasteners through the eave strap into each roof strap, permanently clamping the wall fabric between them.

- C. Straps: Install vertical straps along each column and 5 feet 0 inches on center, maximum, fastening to each girt to retain system permanently in place.

- D. Seal wall fabric to the roof fabric, to the base angle, up the columns.

3.4 CLEANING

- A. Clean any dirt or exposed sealant from the exposed vapor barrier fabric.

- B. Remove scraps and debris from the site.

END OF SECTION