SECTION 072100

FOIL-FACED RIGID INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Provide foil-faced thermal insulation in exterior wall assemblies, to function as a thermal, moisture, and air barrier wall system.

1.2 RELATED WORK

A. Section 054000 - Cold-Formed Metal Framing.

B. Section 076000 - Flashing and Sheet Metal

1.3 REFERENCES

A. American Association of Textile Chemists and Colorists (AATCC): AATCC Test Method 127 – Water Resistance: Hydrostatic Test Pressure.

B. ASTM International (ASTM):
1. ASTM C 203 - Standard Test Methods for Breaking Load and Flexural Properties of Block Type Thermal Insulation.
2. ASTM C 209 - Standard Test Methods for Cellulosic Fiber Insulating Board.
3. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
4. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
5. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
6. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
7. ASTM D 2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
8. ASTM E 84 - Standard Test Method for Surface Burning Characteristics.
9. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
10. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials.
11. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

C. Canadian Test Methods and Specifications:
1. CAN/ULC-S704-11.
2. CCMC Listing 13104-L.
3. CAN/ULC-S102-M88.

D. Intertek or Factory Mutual (FM): Audit Manual.

E. International Code Council - Evaluation Service:
1. ICC-ES AC12 - Acceptance Criteria for Foam Plastic Insulation
2. ICC-ES AC71 - Foam Plastic Sheathing Panels Used as Weather-Resistive Barriers.
3. ICC-ES Evaluation Report ESR-3398 - Johns Manville AP Foil-Faced Sheathing.

F. National Fire Protection Association (NFPA):
   1. NFPA 259 - Standard Test Method for Potential Heat of Building.
   2. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation

G. Underwriters Laboratories (UL and ULC): Audit manual - File R10167.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data sheets including the following:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

B. ICC-ES Evaluation Report: Submit current ESR-3398, Johns Manville AP Foil-Faced Sheathing.

C. Samples: Submit 12 inch square insulation panel.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by insulation system manufacturer to install manufacturer's product.

B. Manufacturer Qualifications: A qualified manufacturer that has ASTM C 1289, NFPA 285, and ASTM E84 listing for continuous insulation system identical to that used for this Project.

C. Source Limitations: Obtain all continuous insulation components from single source manufacturer.

D. Pre-Installation Conference: Before installation, conduct conference at Project site. Comply with requirements for pre-installation conferences in Division 01 Section "Project Management and Coordination." Review methods and procedures related to continuous insulation construction and including the following:

   1. Meet with Owner, Architect, Installer, manufacturer's representative, and installers that interface with or affect the installation of continuous insulation sheathing.
   2. Review metal wall framing assemblies for potential interference and conflicts.
   3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review continuous insulation sheathing guidelines as required by Manufacturer's installation manual.
   5. Review governing regulations and requirements for insurance and certificates if applicable.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver insulation materials to Project site with original packaging unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and installing with other components.

B. Store materials in clean, dry area in manufacturer's unopened packaging until ready for installation and in accordance with manufacturer's instructions and temperature recommendations. Packaging shall be intact with no exposed foam or loose flaps, labels and feet/legs must be securely affixed.

C. Handle and store insulation materials in a manner to avoid damaging materials.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit system to be installed according to manufacturer's written instructions and warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: AP Foil Faced Rigid Insulation as manufactured by Johns Manville; P. O. Box 5108; Denver, Colorado 80217-5108. Toll Free: 800-654-3103. Tel 303-978-4900. Web: www.specjm.com. Approved locations for manufacture:
   1. Bremen, Indiana, U.S. (Plant code 1016)
   2. Cornwall, Ontario, Canada (Plant Code 1017)
   3. Fernley, Nevada, U.S. (Plant Code 1018)
   4. Hazle Township, Pennsylvania, U.S. (Plant Code 1019)
   5. Jacksonville, Florida, U.S. (Plant Code 1020)

2.2 FOIL-FACED RIGID INSULATION

A. General:
   1. Description: Foil-faced, rigid foam insulating sheathing product recommended for concealed uses in commercial and residential construction, complying with ASTM C 1289.
   2. Construction: Foam bonded on both sides in the manufacturing process to foil facers. One side has a printed reflective foil facer and the other side has a printed non-reflective foil facer.
   3. Foam: Closed cell polyisocyanurate, CFC- and HCFC-free.
   4. Service Temperature: -100 degrees F to 250 degrees F (-73 degrees C to 122 degrees C).
   5. Physical Properties:
      a. Thermal Resistance, 1 Inch, ASTM C 518: 6.0 degrees F per square foot per hour per BTU.
      b. Compressive Strength, ASTM D 1621: 16 psi or greater.
      c. Flexural Strength, ASTM C 203: 40 psi or greater.
      d. Water Absorption, ASTM C 209: 0.1 percent by volume.
      e. Water Vapor Permeance, ASTM E 96, 0.05 perms.
      f. Surface Burning Characteristics, ASTM E84, foam core 25 or less flame spread, 450 or less smoke developed.

B. Size: 48 inches wide by 96, 108, or 120 inches long nominal; custom sizes available. Refer also to the Drawings for required thicknesses.
   1. Nominal Thickness: 1/2 inch, R-value 2.7.
   2. Nominal Thickness: 5/8 inch, R-value 3.5.
   3. Nominal Thickness: 3/4 inch, R-value 4.4.
   4. Nominal Thickness: 1 inch, R-value 6.0.
   5. Nominal Thickness: 1-1/2 inches, R-value 9.3.
   6. Nominal Thickness: 2 inches, R-value 13.
   7. Nominal Thickness: 2-1/2 inches, R-value 16.
   8. Nominal Thickness: 3 inches, R-value 19.
   9. Nominal Thickness: 3-1/2 inches, R-value 22.
   10. Nominal Thickness: 4 inches, R-value 26.
   11. Nominal Thickness: 4-1/2 inches, R-value 28.

C. Compliance: Third party quality control agency follow-up service requirements:
   1. Underwriters Laboratories: Must comply with current UL File R10167 audit manual at manufacturing locations.
   2. Factory Mutual: Tested per ASTM E84 Test Method for Surface Burning Characteristics.

3. Intertek: Complies with ASTM C1289, ASTM E84, NFPA 259, and NFPA 285 requirements.
4. AATCC Test Method 127: Accepted; weathered specimens do not exhibit water leakage on the underside of any specimen tested.
5. ASTM Test Methods and Specifications:
   a. ASTM D 2126 (Dimensional Stability): 2 percent maximum linear change at minus 40degF/amb R.H. and at 158degF/97percent R.H, 4 percent maximum linear change @ 200°F/amb R.H.
   b. ASTM E 2178: Air permeance average, with differential pressure of 75 Pa (1.57 lbs./sq.ft), resulting in calculated air flow of 0.0007 L/second sq.m (0.00013 cfm/sq.ft.).
   c. ASTM E 2357: Air leakage rating of 0.00426 liters per second square meter, with the specified design value of Qsub10 greater than 0.20 kPa.
6. ICC-ES AC71: Foam plastic sheathing panels used as weather-resistive barriers.
   a. Section 3.1 - Foam Insulation - Water Resistance (Modified): No water observed on underside of specimens after aging.
   b. Section 3.4.1.5: - Wall Assembly Water Penetration Resistance Testing: No water observed penetrating to the unexposed face of the wall assembly.
7. Canadian Test Methods and Specifications:
   a. CAN/ULC-S704-11: Type 1, Class 1.
   b. CCMC Listing: 13104-L: Type 1, Class 1.

D. Accessories:
1. Insulation Flashing Tape: JM UltraFast® Flashing Tape, 3M All Weather Flashing Tape 8067, or equivalent.
2. Wall Penetration Sealant: Tremco Spectrem 1, or equivalent.
3. Insulation Fasteners: JM UltraFast CI Plates and JM Ultrafast CI Phillips screws, or equivalent.
4. Fasteners: Brick Facing Anchors, Heckman Building Products Wing Nut POS-I-TIE anchors, zinc barrel and wing nut, Hohmann & Barnard, Inc. BL-607, or equivalent.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.2 INSTALLATION

A. Installation over Exterior Sheathing: Install products in strict accordance with manufacturer's recommendations and written instructions, including the following:
1. Begin installation after structural steel, exterior framing and bracing, and structural sheathing is complete.
2. Install boards horizontally (preferred) over exterior sheathing staggered joints relative to exterior sheathing. The reflective side of the board should be oriented to the exterior, and the non-reflective white side should be oriented to the interior.
3. Use maximum board lengths to minimize number of joints. Locate joints square to framing members. Center end joints over framing. Provide additional framing as necessary. Stagger each course at least one stud space to minimize continuous vertical seams. Boards may be installed vertically if less seam sealing results.
4. Butt board edges together tightly, and carefully fit around openings and penetrations.
5. Fasten insulation boards to the exterior face of the stud framing using sheathing manufacturer's recommended fasteners.

6. Space fasteners 16 inches on center at the board perimeter, or consistent with framing spacing, but not greater than 24 inches on center. Space fasteners 24 inches on center in the field, or consistent with framing spacing. One fastener/plate can bridge between a maximum of two adjoining board edges. Drive fasteners so the stress plate is tight and flush with the board surface, but do not countersink.
7. Install exterior cladding ties as applicable.
8. To create an air/water-resistive barrier, tape all seams, edge and end joints, and thru-wall penetrations with sheathing manufacturer's recommended flashing tape. Install flashing shingle-style with a minimum 4 inch overlap, and follow the tape manufacturer's application instructions. Seal fastener penetrations by applying a minimum 4-inch by 4-inch piece of tape over each plate, smoothing tape edges to create an air-tight seal between the tape and the insulation board. Create continuous air/water barrier at roof and foundation wall interface using peel-and-stick membrane, or other approved barrier, following manufacturer's application instructions.
9. Seal penetrations and panel defects with sheathing manufacturer's recommended sealant.
10. Repair any boards damaged during installation. Patch holes less than 1 inch across with flashing tape. Patch holes greater than 1 inch across with matching board material and then seal with flashing tape.
11. As applicable, the wall is now ready for stud cavity insulation and exterior veneer.

B. Installation Direct to Exterior Metal Studs: Install products in strict accordance with manufacturer's recommendations and written instructions, including the following:
1. Begin installation after structural steel and exterior framing and bracing are complete.
2. Install boards horizontally (preferred) using maximum board length to minimize the number of joints. The reflective side of the board shall be oriented to the exterior, and the non-reflective white side shall be oriented to the interior. Locate joints parallel to framing flange. Stagger each course at least one stud space to minimize continuous vertical seams. Boards may be installed vertically if less seam sealing results.
3. Fasten insulation boards to the exterior face of the stud framing using sheathing manufacturer's recommended fasteners.
4. Space fasteners 16 inches on center at the board perimeter, and 16 inches on center in the field of the board. One fastener/plate can bridge between a maximum of two adjoining board edges. Drive fasteners so the stress plate is tight and flush with the board surface, but do not countersink.
5. Install exterior cladding ties as applicable.
6. To create an air/water-resistive barrier, tape all seams, edge and end joints, and thru-wall penetrations with sheathing manufacturer's recommended flashing tape. Install flashing shingle-style with a minimum 4 inch overlap, and follow the tape manufacturer's application instructions. Seal fastener penetrations by applying a minimum 4-inch by 4-inch piece of tape over each plate, smoothing tape edges to create an air-tight seal between the tape and the insulation board. Create continuous air/water barrier at roof and foundation wall interface using peel-and-stick membrane, or other approved barrier, following manufacturer's application instructions.
7. Seal penetrations and panel defects with sheathing manufacturer's recommended sealant.
8. Repair boards damaged during installation. Patch holes less than 1 inch across with flashing tape. Patch holes greater than 1 inch across with matching board material and then seal with flashing tape.
9. As applicable, the wall is now ready for stud cavity insulation and exterior veneer.

3.3 PROTECTION AND CLEANING

A. Protect materials from damage during installation and subsequent construction. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION