A qualified design professional should review and edit the document to suit project requirements.

For additional information, contact R-Seal, Phone: (877) 300-3794; Website: www.r-seal.com
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SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyurethane foam-plastic board insulation

Related Sections: Sections 13 12 00 Pre-Engineered Metal Buildings

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

A.

1. Polyurethane foam-plastic board insulation

B. Sustainable Design Submittals:
1. Product Data: For recycled content, indicating post-consumer and pre-consumer recycled content and cost.
2. Product Data: For adhesives, indicating VOC content.
3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

1.3 INFORMATIONAL SUBMITTALS

A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:
   1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
   2. Protect against ignition at all times. Do not deliver foam-plastic board materials to the project site until just before installation time.
   3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

. PART 2 - PRODUCTS

2.1 POLYURATHANE FOAM-PLASTIC BOARD INSULATION

A. Polyurethane Foam-Plastic Board Insulation: Manufacturer's standard proprietary composite rigid polyurethane-core board with integral factory-applied exterior and interior fiber-reinforced polypropylene scrim facings, with factory-applied tape-tab system for an integral vapor-retarding air barrier membrane; fabricated with 2.0” Flush Board Edge, 2.6” & 3.0” with Tongue and Grooved Board Edge**,** 4.0” & 5.0” with Shiplap Board edges.

   1. Basis-of-Design Product: Subject to compliance with requirements, provide **R-Seal Board Insulation System** a unique polyurethane rigid board insulation system manufactured in custom continuous lengths with factory applied seal tabs (adhesive tabs with release film) developed to be installed on metal building roofs and walls spanning standard purlin and girt spacings without the need for a metal deck or liner. Product to be exposure rated for interior exposure without any additional thermal barrier required. The insulation system is designed to meet or exceed current and known future energy code requirements without the need for additional insulation or weather/moisture barriers. Product to be white in color and have an excellent uniform surface appearance suitable for finished interior surface.

B. Project Specific Manufactures Shop Drawings: Shop drawings to be completed and provided by product manufacturer. Manufacturer to provide wall elevation and roof plan view panel layout drawings showing the relationship to the building’s primary framing and secondary framing. Panel manufacturer to include details for panel terminations and transitions between all wall and roof planes.

C. Composite product flame-spread and smoke-developed tested actual performance of FSI 5 and SDI 200, respectively, tested in accordance with ASTM E84 Class A Listed maximum FSI < 25 SDI <450; / Full-Scale Fire Test when tested in accordance with UL 1715 (PASS).

D. Composite product flame-spread and smoke-developed tested actual performance of FSI 10 and SDI 105, respectively, tested in accordance with CAN/ULC S102 Class A Listed maximum FSI < 25 SDI <450 / Full-Scale Fire Test when tested in accordance with CAN/ULC S138 (PASS).

E. NFPA 286 Section 9 (PASS).

F. 2015 IBC Section 803.1.2.1 / NFPA 286 Annex C (PASS).

2.2 BOARD CORE INSULATION

A. 31-psi (Perpendicular) minimum compressive strength when tested in accordance with ASTM D1621.

B. Density to be between 2.0 and 2.5 lb. per cubic ft. when tested in accordance with ASTM D1622.

C. Maximum vapor permeance of 2.27-perm at 1-inch (25.4-mm) thickness when tested in accordance with ASTM E96.

D. Maximum air permeance of 0.004 cubic ft. per minute per sq. ft. under pressure.

E. R7.5 minimum stable R-value at 1-inch (25.4-mm) thickness when tested in accordance with ASTM C518.

R-Value	U-Factor	Thickness / Inches	Joint Style
R-15	0.064	2.0”	Flush/Butt
R-20	0.050	2.6”	Tongue and Grooved
R-22.5	0.044	3.0”	Tongue and Grooved
R-30	0.031	4.0”	Shiplap
R-37.5	0.027	5.0”	Shiplap

F. Thermal Transmission Tested in accordance with ASTM C518-15 Thermal TRANSMISSION BY MEANS OF THE HEAT FLOW APPARATUS.

Tested at Mean temperature of 75 degrees. – Thermal Resistance “R” per inch: **7.5**

Tested at Mean temperature of 55 degrees. – Thermal Resistance “R” per inch: **7.7**

Tested at Mean temperature of 20 degrees. – Thermal Resistance “R” per inch: **8.7**

G. Mold-resistant (no growth) when tested in accordance with ASTM C665 and ASTM C1338.

H. Board insulation to be left exposed to the interior of the building without an additional thermal barrier.

2.3 INTEGRAL AIR BARRIER FACING

A. Light Reflectance (LR) to be not less than 85 percent when tested in accordance with ASTM C523.

B. Bursting Strength to be not less than 120 psi (827 kPa) when tested in accordance with ASTM D774.

C. Tensile Strength to be not less than 195 lb./inch width (MD) and not less than 150 lb./inch width (XD) when tested in accordance with ASTM C1136.

D. Permeance (Moisture Vapor) 0.02-perm (grains/hrft^2 when tested in accordance with ASTM E96 (A).

E. Remain flexible with no delamination when tested at low temperature of minus 40 deg F (minus 40 deg C) and high temperature of 240 deg F (115 deg C) when tested in accordance with ASTM D1790.

F. Highly resistant to solvents and chemicals when tested in accordance with ASTM D543.

G. Excellent resistance to environmental stress cracking when tested in accordance with ASTM D1693.

H. Mold-resistant (no growth) when tested in accordance with ASTM C1338.

2.4 INTEGRAL TAPE TAB

A. Adhesive Type Acrylic

B. Liner Type Polycoated Kraft Paper

C. Liner Color White

D. High Temperature Operating Range 250 *F

E. UV Resistance Adhesive is resistant to oxidation and ozone when exposed to air or UV light.

PART 3 - PERFORMANCE REQUIREMENTS

3.1 AIR BARRIER

A. Air Barrier Tape: Pressure-sensitive tape of type recommended by board insulation manufacturer for sealing joints and penetrations in integral air barrier facing.

B. Air Barrier Air Leakage: Meets ASHRAE Air Leakage – 0.25 CFM / Army Core of Engineers – ACOE – 0.15 CFM Air Leakage requirements.

C Air Barrier ASTM E283 Assembly for determining Rate of Air Leakage: PASS / 0.04 CFM/ft^2 at 75PA

D. Air Barrier ASTM E779 Whole Building Test Rate of Air Leakage: PASS / 0.4 CFM/ft^2 at 75PA

E. Air Barrier ASTM E779 Whole Building Test Rate of Air Leakage: Average 0.1 CFM/ft^{2n} at 75 PA, based on field testing.

3.2 WATER INFILTRATION

A. Water Barrier ASTM E331 Tested Method for Water Penetration: 15 min @ 2.86 psf / PASS – 2 hr. @ 6.24 psf (PASS)

3.3 Structural Performance:

A. OSHA Drop Test Standard (1926.502(c)(4)(i) Fall Protection for Walking-Working Surface (PASS)

PART 4 - MISCELANEOUS

4.1 ACCESSORIES

A. Metal Trim: By Building Manufacturer

B. Base Support Trim: Per approved project specific details.

C. Roof Panel Bearing Support: Per PEMB/roof system manufacturer approved detail.

D. Eave Support Trim: Per approved project specific details.

E. Roof to Wall Transition: Per approved project specific details.

F. Butt joint Detail: Per approved project specific details.

G. Tapes and Weather-Resistive Barriers

1. Double-Faced Application Tape – ¾” wide with release liner.

2. Patch Tape – 3” wide with pressure sensitive adhesive under release tap. Manufactured by Lamtec Corporation with matching facing.

3. Weather Resistive Barrier (WRB) -12” non-asphaltic polypropylene film with butyl modified adhesive providing a 14-mil self-adhesive membrane manufactured by GCP Applied Technologies or approved substitution.

4. Sill Sealer – standard foam sill sealer.

5. Non-Skinning Butyl Sealant to be 100% solids applied not less than 3/16” diameter; non-sag, and permanently elastic. Sikalastomer®-511 or equal, substitution.

6. Joint Seam Tape – 4” wide self-adhesive 35 mil repair tape manufactured with thermoplastic elastomers. Roof X-Tender or approved equal substitution.