SECTION 07 21 13
CONTINUOUS INSULATION

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PART 1 GENERAL

1.1 SECTION INCLUDES

A. Polyisocyanurate Foam-Plastic Board Wall Insulation System:
   1. Insulated air and water-resistive barrier system.
      a. ECOMAXci Wall Solution.

B. Aluminum-Faced and Coated Glass Mat Faced Insulation:
   1. Aluminum-faced, polyisocyanurate-foam insulating sheathing.
      a. ECOMAXci FR Air Barrier.
      b. ECOMAXci FR.
      c. Thermasheath.
      d. Durasheath.
   2. Aluminum-faced, polyisocyanurate-foam interior exposed insulation and insulating sheathing.
      a. ECOMAXci FR.
      b. TSX-8510.
   3. Polymer coated glass fiber mat-faced, polyisocyanurate-foam insulating sheathing.
      a. Durasheath.

C. Board Faced Insulation and SI-Structural Insulation:
   1. Fire-retardant-treated nail base insulating sheathing.
      a. ECOMAXci FR Ply.
      b. ECOMAXci Ply.
   2. Nail base insulating sheathing.
      a. ThermaBase-CI (TS).
      b. ThermaBase-CI (DS).
   3. Aluminum-faced, polyisocyanurate-foam insulating structural sheathing.
      a. Thermasheath-SI.

D. Polyisocyanurate Foam-Plastic Roof Insulation:
   1. Aluminum-faced, polyisocyanurate-foam roof insulation.
      a. Thermaroof Plus-3.
   2. Glass fiber/organic mat-faced (GRF) including Tapered insulation.
      a. Multi-Max FA-3 (GRF).
      b. Tapered Thermaroof Plus-3 (GRF).
      c. Recover Board (GRF).
   3. Inorganic polymer-coated glass fiber mat-faced (CGF) including tapered insulation.
      a. Ultra-Max (CGF).

b. Tapered Ultra-Max (CGF).
c. Recover Board (CGF).

4. High-density 1/2 inch (13 mm) cover board.
   a. Ultra-Max FA-3.
5. Nail base insulating roof insulation
   a. Nailable Base-3.

E. Accessories:
1. Insulation fastener components.
2. Insulation joint and flashing components.
3. Interior insulation attachment and joint closure system.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 03 41 16 - Precast Concrete Slabs.

C. Section 05 40 00 - Cold-Formed Metal Framing.

D. Section 04 40 00 - Stone Assemblies.

E. Section 04 26 00 - Terra Cotta Panels*.

F. Section 06 10 00 - Rough Carpentry.

G. Section 07 27 19 - Plastic Sheet Air Barriers .

H. Section 07 27 00 - Air Barriers.

I. Section 07 50 00 - Membrane Roofing.

J. Section 09 22 16 - Non-Structural Metal Framing.

K. Section 09 25 23 - Lime Based Plastering.

1.3 REFERENCES

A. American Architectural Manufacturers Association (AAMA):
1. AAMA 508 - Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems.
2. AAMA 509 - Voluntary Test and Classification Method for Drained and Back Ventilated Rain Screen Wall Cladding Systems.
3. AAMA 711 - Voluntary Specification for Self-Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.
4. AAMA 714 - Voluntary Specification for Liquid Applied Flashing Used to Create a Water-Resistive Seal around Exterior Wall Openings in Buildings.
5. AAMA 2605 - ANSI/SBCA FS 100-2012 Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies.

B. American Association of Textile Chemists and Colorists (AATCC):
1. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test.

C. Air Barrier Association of America (ABAA).

D. American National Standards Institute (ANSI):
1. ANSI/SBCA FS 100-2012 - Standard Requirements for Wind Pressure Resistance of

Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies.

E. ASTM International (ASTM):
   1. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.
   2. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board.
   3. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
   4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
   5. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
   6. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
   7. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
   8. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
   9. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
   10. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   11. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
   12. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
   13. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
   14. ASTM E564 - Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings.
   15. ASTM E2126 - Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings.
   16. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
   17. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

F. International Code Council (ICC):
   1. ICC-ES AC71 - Acceptance Criteria for Foam Plastic Sheathing Panels Used as Weather-resistive Barriers.

G. National Fire Protection Association (NFPA):
   1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.
   2. NFPA 286 - Standard Methods Of Fire Tests For Evaluating Contribution Of Wall And Ceiling Interior Finish To Room Fire Growth.

H. Standards Council of Canada (CAN):
   1. CAN/ULC-S742 (A1) - Standard for Air Barrier Assemblies-Specification.

I. Structural Building Components Association (SBCA).

J. Structural Building Components Research Institute (SBCRI):
   1. SBCRI Single Element Lateral Load Testing.

K. Underwriters Laboratories (UL): USA.
   1. UL 723 - Standard for Test for surface Burning Characteristics of Building Materials.
   2. UL 790 - Standard Test Methods for Fire Test of Roof Coverings.
   3. UL 1256 - Fire Test of Roof Deck Construction.
   4. UL 1715 - Fire Test of Interior Finish Material.

L. Underwriters Laboratories (ULC): Canada.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

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 methods.

C. Shop Drawings: Show fabrication and installation layouts of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
   1. Accessories: Include details of all integral panel components and their interface with adjacent materials.
   2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (102 x 150 mm).

E. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum ten years experience.

F. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

G. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
   3. Remodel mock-up area as required to produce acceptable work.

H. Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, foundation/structural system/substrate conditions, and insulation manufacturer's installation instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store and handle products per manufacturer's instructions until ready for installation.

1.6 SEQUENCING

A. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.7 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 recommended limits.

1.8 WARRANTY

A. Insulation Warranty: At project closeout, provide to Owner an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Rmax - A Business Unit of the Sika Corporation, which is located at 13524 Welch Rd.; Dallas, TX 75244-5227; Toll Free Tel: 800-527-0890; Tel: 972-387-4500; Fax: 972-387-4673; Technical Tel: 972-850-3604; Email: technical@rmax.com; Web: www.rmax.com.
   1. Manufacturing plant locations in Dallas, TX, Greer, SC, and Fernley, NV, to serve multiple regions.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 POLYISOCYANURATE FOAM-PLASTIC BOARD - INSULATED AIR AND WATER-RESISTIVE BARRIER SYSTEM

A. Insulated Air and Water-Resistive Barrier System: Complete single-source continuous insulation system including tapes and flashings. providing air and water-resistive barrier. Tested in accordance with ASTM E2357 and ICC-ES AC71 Acceptance Criteria for Foam Plastic Sheathing Panels Used As Water-Resistive Barriers and listed as an Air Barrier Association of America (ABAA) Evaluated Boardstock Air Barrier Assembly. The system incorporates polyisocyanurate foam insulation board, joint tapes, flashing tapes, liquid sealant, and flashing materials, by one manufacturer. Acceptable for inclusion in exterior wall assemblies when tested in accordance with NFPA 285 with or without exterior gypsum sheathing.

B. Basis of Design: ECOMAXci Wall Solution System from Rmax.
   1. System substitutions not be permitted, except when the system substitution includes all components and materials, that have been tested by the manufacturer as a total system. Submission of documentation substantiating testing and compliance shall be required.
   2. Exterior Usage in NFPA 285 Wall Assemblies:
      a. System and all components to be installed within the system shall be acceptable for inclusion in NFPA 285 exterior wall assemblies, including those that do not include exterior gypsum sheathing.

C. System Insulation Board Component: ECOMAXci FR Air Barrier from Rmax.
   1. Aluminum-Faced, Polyisocyanurate-Foam Insulating Sheathing: ASTM C1289, Type I, Class 1 or Class 2, rigid, cellular, polyisocyanurate thermal insulation, bonded to glass fiber reinforced aluminum facers on both sides. Heavy embossed 12 mil facer with aluminum reflective surface on exposed side.
   2. Flame Spread Index and Smoke Contribution per ASTM E84:
      a. Flame: 25 or less.
      b. Smoke: 450 or less.
   3. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
   4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or

less.

5. Compressive Strength per ASTM D1621: 25 psi (172 kPa).
6. R-Value per ASTM C518: R-6.5 minimum at thickness of 1 inch (25 mm) and R-13.1 minimum at thickness of 2 inches (51 mm).
7. Required Insulation Thickness and R-value: As indicated on the Drawings.

D. System Fastening Components:
   1. General - Fasteners for Fastening Polyisocyanurate Wall Insulation to Wood Framing Components and Light Gauge Metal Wall Framing:
      a. Steel drill screws, in type and length recommended by insulating sheathing manufacturer for thickness of insulating sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117. Fasteners in contact with fire-retardant-treated wood shall be of suitable material or provided with coating suitable for such use.
      b. Provide washers or plates if recommended by insulating sheathing manufacturer. Washers shall be compatible with screw fasteners.
   2. Fasteners for Fastening Polyisocyanurate Wall Insulation to metal stud framed wall surfaces:
      a. Self-drilling ceramic coated screw.
         1) Product: Rodenhouse Grip-Deck screws.
   3. Fasteners for Fastening Polyisocyanurate Wall Insulation to Concrete or Masonry Wall Surfaces:
      a. One-piece plastic washer and stem, installed in pre-drilled hole in concrete or masonry.
         1) Product: Rodenhouse Plasti-Grip PMF Plastic Masonry Fastener.
   4. Washers: Self-sealing for use with Self-drilling screws:
      a. Self-sealing 2 inches (51 mm) diameter polymer washer, UV stabilized, tested, and approved to provide air and water-resistive seal, in combination with compatible self-drilling screw.
         1) Product: Rodenhouse Thermal-Grip ci prong washer.
   5. Washers: Self-sealing for use with barrel style brick ties:
      a. Self-sealing 2 inches (51 mm) diameter UV stabilized polymer washer tested and approved to provide air and water-resistive seal, barrel-style brick ties.
         1) Product: Rodenhouse Thermal-Grip brick tie washer.
   6. Washers: Perforated washers for use with self-drilling screws:
      a. Perforated face washers 1.75 inch (44 mm) diameter polymer washer, with additives for extended UV exposure for use in combination with compatible self-drilling screw.
         1) Product: Rodenhouse Plasti-Grip ci prong washer.
   7. Washers: Perforated Hurricane/High-Wind washers for use with self-drilling screws:
      a. Perforated face washers 3.0 inch diameter polymer washer, with additives for extended UV exposure for use in combination with compatible self-drilling screw.
         1) Product: Rodenhouse Grip-Lok hurricane washer.

E. System Joint Sealants, Joint Tapes, and Flashing Materials:
   1. General - Joint Treatment and Flashing Components:
      a. Material Standards:
         1) AAMA 711: For self-adhered flashing and joint materials.
         2) AAMA 714: For liquid applied flashing and joint materials.
      b. Components for use at static joints, joining adjacent aluminum-faced insulation panels include liquid flashing, adhered joint tape, and adhered flashing and transition tape.
      c. Components for use at static joints, joining aluminum-faced insulation and adjacent elements, including window and wall openings and items penetrating

the insulation include: liquid flashing and adhered flashing and transition tape.

d. Components for use at dynamic joints at aluminum-faced insulation of up to 3/4 inch (19 mm) in width, shall be restricted to the use of flashing and transition tape, or materials and devices specifically designed to allow for dynamic movement.

e. Components for use at dynamic joints at aluminum-faced insulation over 3/4 inch (19 mm) in width, shall be restricted to the use of materials and devices specifically designed for such joint widths.

2. Liquid Flashing for Stationary Joint Treatment of Foil Faced Polyisocyanurate Insulation:
   a. Product: Rmax R-SEAL 2000 LF sealant or comparable product.
      1) One-component flexible flashing and water-resistive barrier sealant.
      2) ASTM C920, Type S, Grade NS, Class 12.5, use NT, G, A, O, M.
      3) Application Temperature Range: 40 to 104 degrees F (4 to 40 degrees C).
      4) Service Range: -40 to 170 degrees F (-40 to 77 degrees C).
      5) Curing Rate:
         a) Skin Formation Time: 60 to 90 minutes.
         b) Cure Depth: 0.16 inch (4 mm) in 24 hours.
3. Joint Sealant Tape for Stationary Joint Treatment of Foil Faced Polyisocyanurate Insulation:
   a. Product: Rmax R-SEAL 3000 tape or comparable product.
      1) Dead soft aluminum foil coated with acrylic pressure-sensitive adhesive.
      2) Width: 4 inches (102 mm).
      3) Width: 5 inches (127 mm) for use where coverage is necessary.
      4) Width: 5 inches (127 mm) for systems involving High-Velocity Hurricane Zones.
4. Flashing and Transition Tape for Joints Subject to Movement and Openings at Foil Faced Polyisocyanurate Insulation, and transition to other building materials.
   a. Product: Rmax R-SEAL 6000 tape or comparable product.
      1) Polyethylene membrane with butyl rubber adhesive.
      2) Width 9 and 12 inches (229 and 305 mm).

2.3 ALUMINUM-FACED AND COATED GLASS MAT FACED INSULATION

A. Aluminum-Faced, Polyisocyanurate-Foam Insulating Sheathing: ASTM C1289, Type I, Class 1 or Class 2, rigid, cellular, polyisocyanurate thermal insulation, bonded to glass fiber reinforced aluminum facers on both sides. Heavy embossed 12 mil facer with aluminum reflective surface on exposed side.
   1. Basis of Design: ECOMAXci FR Air Barrier from Rmax.
   2. Flame Spread Index and Smoke Contribution per ASTM E84:
      a. Flame: 25 or less.
      b. Smoke: 450 or less.
   3. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
   4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
   5. Compressive Strength per ASTM D1621: 25 psi (172 kPa).
   6. R-Value per ASTM C518: R-6.5 minimum at thickness of 1 inch (25 mm) and R-13.1 minimum at thickness of 2 inches (51 mm).
   7. Required Insulation Thickness and R-value: As indicated on the Drawings.
   8. Exterior Usage in NFPA 285 Wall Assemblies:
      a. Acceptable for inclusion in NFPA 285 exterior wall assemblies, including those that do not include exterior gypsum sheathing.
   9. Insulation board shall be compatible single-source system component of a tested air and water-resistive barrier system passing or exceeding all requirements of ICC-ES AC71 (ASTM E331, AATC Test Method 127), ABAA Evaluated Air Barrier Assembly

for Boardstock - Rigid Cellular Thermal Insulation Board (ASTM E2357), and CAN/ULC-S742 (A1).

B. Aluminum-Faced, Polyisocyanurate-Foam Interior Exposed Insulation and Insulating Sheathing: ASTM C1289, Type I, Class 1 or Class 2, rigid, cellular, polyisocyanurate thermal insulation, bonded to glass fiber reinforced aluminum facers on both sides. Heavy embossed 12 mil facer with aluminum reflective surface on exposed side.
   1. Basis of Design: ECOMAXci FR from Rmax.
   2. Flame Spread Index and Smoke Contribution per ASTM E84:
      a. Flame: 25 or less.
      b. Smoke: 450 or less.
   3. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
   4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
   5. Compressive Strength per ASTM D1621:
      a. 20 psi (138 kPa).
      b. 25 psi (172 kPa).
   6. R-Value per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-13.1 minimum at thickness of 2 inches (51 mm).
   7. Required Insulation Thickness and R-value: As indicated on the Drawings.
   8. Insulation shall be suitable as continuous exterior wall insulation.
   9. Insulation shall be determined to be suitable for exposed interior use. Testing to be conducted in accordance with UL 1715 or NFPA 286, as addressed in IBC Section 2603.9 Special Approval; relative to the following:
      a. Without need for an ignition barrier on walls and ceilings.
      b. Without need for an ignition barrier on walls or ceilings within the same building space, conforming to the following:
         1) On walls only for insulation thickness of 4.5 inches (114 mm) maximum.
         2) On ceilings only for insulation thickness of 12 inches (305 mm).
   10. Exterior Usage in NFPA 285 Wall Assemblies:
      a. Acceptable for inclusion in NFPA 285 exterior wall assemblies, including those that do not include exterior gypsum sheathing.

C. Aluminum-Faced, Polyisocyanurate-Foam Interior Exposed Insulation and Insulating Sheathing: ASTM C1289, Type I, Class 1 or Class 2, rigid, cellular, polyisocyanurate thermal insulation, bonded to glass fiber reinforced aluminum facers on both sides. Heavy embossed 12 mil facer with a white modified acrylic coating on exposed side.
   1. Basis of Design: TSX-8510 from Rmax.
   2. Flame Spread Index and Smoke Contribution per ASTM E84:
      a. Flame: 25 or less.
      b. Smoke: 450 or less.
   3. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
   4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
   5. Compressive Strength per ASTM D1621:
      a. 20 psi (138 kPa).
      b. 25 psi (172 kPa).
   6. R-Value per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-13.1 minimum at thickness of 2 inches (51 mm).
   7. Required Insulation Thickness and R-value: As indicated on the Drawings.
   8. Insulation shall be determined to be suitable for exposed interior use. Testing to be conducted in accordance with UL 1715 or NFPA 286, as addressed in IBC Section 2603.9 Special Approval; relative to the following:
      a. Without need for an ignition barrier on walls and ceilings.
      b. Without need for an ignition barrier on walls or ceilings within the same building space, conforming to the following:

1) On walls only for insulation thickness of 4.5 inches (114 mm) maximum.
2) On ceilings only for insulation thickness of 12 inches (305 mm).

D. Aluminum-Faced, Polyisocyanurate-Foam Insulating Sheathing: ASTM C1289, Type I, Class 1 or Class 2, rigid, cellular, polyisocyanurate thermal insulation, bonded to reinforced aluminum facers on both sides.
1. Basis of Design: Thermasheath from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 or less at thickness of 1 inch (25 mm) or greater; and 75 or less at thickness of less than 1 inch (25 mm).
   b. Smoke: 450 or less.
3. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
5. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa).
   b. 25 psi (172 kPa).
6. R-Value per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-13.1 minimum at thickness of 2 inches (51 mm).
7. Required Insulation Thickness and R-value: As indicated on the Drawings.
8. Insulation shall be suitable as continuous exterior wall insulation.
9. Exterior Usage in NFPA 285 Wall Assemblies:
   a. Acceptable for inclusion in NFPA 285 exterior wall assemblies that include exterior gypsum sheathing.

E. Polymer Coated Glass Fiber Mat-Faced, Polyisocyanurate-Foam Insulating Sheathing: ASTM C1289, Type II, Class 2, rigid, cellular, polyisocyanurate thermal insulation
1. Basis of Design: Durasheath from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 or less at thickness of 1 inch (25 mm) or greater; and 75 or less at thickness of less than 1 inch (25 mm).
   b. Smoke: 450 or less.
3. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
5. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa).
   b. 25 psi (172 kPa).
6. R-Value per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-12.1 minimum at thickness of 2 inches (51 mm).
7. Required Insulation Thickness and R-value: As indicated on the Drawings.
8. Insulation shall be suitable as continuous exterior wall insulation.
9. Exterior Usage in NFPA 285 Wall Assemblies:
   a. Acceptable for inclusion in NFPA 285 exterior wall assemblies that include exterior gypsum sheathing.

2.4 BOARD FACED INSULATION AND SI-STRUCTURAL INSULATION

A. Fire-Retardant-Treated Nail Base Insulating Sheathing, Consisting of Aluminum-Faced, Polyisocyanurate-Foam Insulating Sheathing bonded to Fire-Retardant-Treated Plywood: ASTM C1289, Type V with Type I, Class 1 or Class 2, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Rmax; ECOMAXci FR Ply.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 or less.
   b. Smoke: 450 or less.

3. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
5. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa).
   b. 25 psi (172 kPa).
6. R-Value of insulation component per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-13.1 minimum at thickness of 2 inches (51 mm).
7. Required Insulation Thickness and R-value: As indicated on the Drawings.
8. Exterior Usage in NFPA 285 Wall Assemblies:
   a. Acceptable for inclusion in NFPA 285 exterior wall assemblies, including those that do not include exterior gypsum sheathing.
9. Fire-Retardant-Treated Plywood Thickness:
   a. Fire-Retardant-Treated Plywood, Exposure 1: 5/8 inch (16 mm).
   b. Fire-Retardant-Treated Plywood, Exposure 1: 3/4 inch (19 mm).

B. Fire-Retardant-Treated Nail Base Insulating Sheathing, Consisting of Polymer-Coated Glass Fiber Mat-Faced, Polyisocyanurate-Foam Insulating Sheathing bonded to Fire-Retardant-Treated Plywood: ASTM C1289, Type V with Type II, Class 2, rigid, cellular polyisocyanurate thermal insulation.
1. Basis of Design: Rmax; ECOMAXci Ply.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 or less for foam insulation component at thickness of 1 inch (25 mm) or greater, and 75 or less for foam insulation component at thickness of less than 1 inch (25 mm).
   b. Flame: 25 or less for fire-retardant-treated plywood.
   c. Smoke: 450 or less for foam insulation and fire-retardant-treated plywood.
3. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
5. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa).
   b. 25 psi (172 kPa).
6. R-Value of insulation component per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-12.1 minimum at thickness of 2 inches (51 mm).
7. Required Insulation Thickness and R-value: As indicated on the Drawings.
8. Exterior Usage in NFPA 285 Wall Assemblies:
   a. Acceptable for inclusion in NFPA 285 exterior wall assemblies that include exterior gypsum sheathing.
9. Fire-Retardant-Treated Plywood Thickness:
   a. Fire-Retardant-Treated Plywood, Exposure 1: 5/8 inch (16 mm).
   b. Fire-Retardant-Treated Plywood, Exposure 1: 3/4 inch (19 mm).

C. Nail Base Insulating Sheathing, Consisting of Aluminum-Faced, Polyisocyanurate-Foam Insulating Sheathing bonded to OSB or Plywood: ASTM C1289, Type V with Type I, Class 1 or Class 2, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Rmax; ThermaBase-CI (TS).
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 or less for foam insulation component at thickness of 1 inch (25 mm) or greater; and 75 or less at thickness of less than 1 inch (25 mm).
   b. Flame: 75 or less for plywood or OSB component.
   c. Smoke: 450 or less.
3. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
5. Compressive Strength per ASTM D1621:

a. 20 psi (138 kPa).
b. 25 psi (172 kPa).

6. R-Value per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-13.1 minimum at thickness of 2 inches (51 mm).
7. Required Insulation Thickness and R-value: As indicated on the Drawings.
8. Nailable Material and Thickness:
   a. Oriented-Strand-Board Nominal Thickness: 7/16 inch (11 mm).
   b. Oriented-Strand-Board Nominal Thickness: 1/2 inch (13 mm).
   c. Oriented-Strand-Board Nominal Thickness: 5/8 inch (16 mm).
   d. Oriented-Strand-Board Nominal Thickness: 3/4 inch (19 mm).
   e. Plywood Nominal Thickness, Exposure 1: 1/2 inch (13 mm).
   f. Plywood Nominal Thickness, Exposure 1: 5/8 inch (16 mm).
   g. Plywood Nominal Thickness, Exposure 1: 3/4 inch (19 mm).

D. Nail Base Insulating Sheathing, Consisting of Polymer-Coated Glass Fiber Mat-Faced, Polyisocyanurate-Foam Insulation Bonded to OSB or Plywood: ASTM C1289, Type V with Type II, Class 2, rigid, cellular polyisocyanurate thermal insulation.
1. Basis of Design: Rmax; ThermaBase-CI (DS).
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 or less for foam insulation component at thickness of 1 inch (25 mm) or greater; and 75 or less at thickness of less than 1 inch (25 mm).
   b. Flame: 75 or less for plywood or OSB component.
   c. Smoke: 450 or less.
3. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
5. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa).
   b. 25 psi (172 kPa).
6. R-Value per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-12.1 minimum at thickness of 2 inches (51 mm).
7. Required Insulation Thickness and R-value: As indicated on the Drawings.
8. Nailable Material and Thickness:
   a. Oriented-Strand-Board Nominal Thickness: 7/16 inch (11 mm)
   b. Oriented-Strand-Board Nominal Thickness: 1/2 inch (13 mm).
   c. Oriented-Strand-Board Nominal Thickness: 5/8 inch (16 mm).
   d. Oriented-Strand-Board Nominal Thickness: 3/4 inch (19 mm).
   e. Plywood Nominal Thickness, Exposure 1: 1/2 inch (12.7 mm).
   f. Plywood Nominal Thickness, Exposure 1: 5/8 inch (15.9 mm).
   g. Plywood Nominal Thickness, Exposure 1: 3/4 inch (195.1 mm).

E. Aluminum-Faced, Polyisocyanurate-Foam Insulating Sheathing: ASTM C1289, Type I, Class 1 or Class 2, rigid, cellular, polyisocyanurate thermal insulation, bonded to reinforced aluminum facers on both sides and structural component bonded to one side.
1. Basis of Design: Thermasheath-SI from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 or less for foam insulation component at thickness of 1 inch (25 mm) or greater; and 75 or less at thickness of less than 1 inch (25 mm).
   b. Smoke: 450 or less.
3. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
4. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
5. R-Value per ASTM C518:
   a. Insulation Thickness and R-Value: 1/2 inch (13 mm) at R-3.2
   b. Insulation Thickness and R-Value: 3/4 inch (19 mm) at R-5.0
   c. Insulation Thickness and R-Value: 1 inch (25 mm) at R-6.0.

d. As indicated on the Drawings.

2.5 POLYISOCYANURATE FOAM-PLASTIC ROOF INSULATION

A. Aluminum-Faced, Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type I, Class 1 and Class 2, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Thermaroof Plus-3 from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 to 60.
   b. Smoke: 75 to 160.
3. Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal Flame (UL Standard 1256).
4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Water Vapor Permeability per ASTM E96 desiccant method: 0.03 perm or less.
6. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
7. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa) nominal.
   b. 20 psi (138 kPa) Grade 2.
   c. 25 psi (172 kPa) Grade 3.
8. LTTR-Value per ASTM C518: R-6.0 minimum at thickness of 1 inch (25 mm) and R-20.3 minimum at thickness of 3 inches (76 mm).
9. Required Insulation Thickness and R-value: As indicated on the Drawings.

B. Glass Fiber/Organic Mat-Faced (GRF), Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type II, Class 1, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Multi-Max FA-3 from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 to 60.
   b. Smoke: 75 to 160.
3. Above Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal Flame (UL Standard 1256).
4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
6. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
7. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa) nominal.
   b. 20 psi (138 kPa) Grade 2.
   c. 25 psi (172 kPa) Grade 3.
8. LTTR-Value per ASTM C518: R-8.6 minimum at thickness of 1.5 inches (38 mm) and R-17.4 minimum at thickness of 3 inches (76 mm).
9. Required Insulation Thickness and R-value: As indicated on the Drawings.

C. Tapered Glass Fiber/Organic Mat-Faced (GRF), Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type II, Class 1, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Rmax; Tapered Thermaroof-3.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 to 60.
   b. Smoke: 75 to 160.
3. Above-Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal

Flame (UL Standard 1256).

4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
6. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
7. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa) nominal.
   b. 20 psi (138 kPa) Grade 2.
   c. 25 psi (172 kPa) Grade 3.
8. LTTR-Value per ASTM C518: As determined by average thickness of panel.
9. Required Insulation Thickness and R-value: As indicated on the Drawings.
10. Tapered Insulation: Utilize tapered insulation as indicated on drawings to create required roof slopes.
    a. Tapered Insulation Slope: 1/8 inch per foot (10 mm per m).
    b. Tapered Insulation Slope: 1/4 inch per foot (21 mm per m).
    c. Tapered Insulation Slope: 1/2 inch per foot (42 mm per m).

D. Glass Fiber/Organic Mat-Faced (GRF), Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type II, Class 1, rigid, cellular, polyisocyanurate thermal insulation.

1. Basis of Design: Rmax; Multi-Max FA-3 in conjunction with Rmax; Tapered Thermaroof-3 to form the tapered roof insulation system.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 to 60.
   b. Smoke: 75 to 160.
3. Above Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal Flame (UL Standard 1256).
4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
6. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
7. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa) nominal.
   b. 20 psi (138 kPa) Grade 2.
   c. 25 psi (172 kPa) Grade 3.
8. LTTR-Value per ASTM C518: R-8.6 minimum at thickness of 1.5 inches (38 mm) and R-17.4 minimum at thickness of 3 inches (76 mm).
9. Tapered Insulation LTTR-Value per ASTM C518: As determined by average thickness of panel.
10. Required Insulation Thickness and R-value: As indicated on the Drawings.
11. Tapered Insulation: Utilize tapered insulation as indicated on drawings to create required roof slopes.
    a. Tapered Insulation Slope: 1/8 inch per foot (10 mm per m).
    b. Tapered Insulation Slope: 1/4 inch per foot (21 mm per m).
    c. Tapered Insulation Slope: 1/2 inch per foot (42 mm per m).

E. Glass Fiber/Organic Mat-Faced (GRF), Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type II, Class 1, rigid, cellular, polyisocyanurate thermal insulation.

1. Basis of Design: Re-Cover Board-3 (GRF) from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 to 60.
   b. Smoke: 75 to 160.
3. Above Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal

Flame (UL Standard 1256).
4. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
5. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
6. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa) nominal.
   b. 20 psi (138 kPa) Grade 2.
   c. 25 psi (172 kPa) Grade 3.
7. LTTR-Value per ASTM C518: R-5.7 minimum at thickness of 1 inch (25 mm) and R-8.0 minimum at thickness of 1.40 inches (36 mm).
8. Required Insulation Thickness and R-value: As indicated on the Drawings.

F. Inorganic Polymer Coated Glass Fiber Mat-Faced (CGF), Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type II, Class 2, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Rmax; Ultra-Max.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 to 60.
   b. Smoke: 75 to 160.
3. Above Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal Flame (UL Standard 1256).
4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
6. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
7. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa) nominal.
   b. 20 psi (138 kPa) Grade 2.
   c. 25 psi (172 kPa) Grade 3.
8. LTTR-Value per ASTM C518: R-8.6 minimum at thickness of 1.5 inches (38 mm) and R-17.4 minimum at thickness of 3 inches (76 mm).
9. Required Insulation Thickness and R-value: As indicated on the Drawings.

G. Tapered Inorganic Polymer Coated Glass Fiber Mat-Faced (CGF), Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type II, Class 2, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Tapered Ultra-Max from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 25 to 60.
   b. Smoke: 75 to 160.
3. Above-Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal Flame (UL Standard 1256).
4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
6. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
7. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa) nominal.
   b. 20 psi (138 kPa) Grade 2.
   c. 25 psi (172 kPa) Grade 3.
8. LTTR-Value per ASTM C518: As determined by average thickness of panel.
9. Required Insulation Thickness and R-value: As indicated on the Drawings.
10. Tapered Insulation: Utilize tapered insulation as indicated on drawings to create

required roof slopes.
a. Tapered Insulation Slope: 1/8 inch per foot (10 mm per m).
b. Tapered Insulation Slope: 1/4 inch per foot (21 mm per m).
c. Tapered Insulation Slope: 1/2 inch per foot (42 mm per m)

H. Inorganic Polymer Coated Glass Fiber Mat-Faced (CGF), Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type II, Class 2, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Ultra-Max and Rmax; Tapered Ultra-Max from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
a. Flame: 25 to 60.
b. Smoke: 75 to 160.
3. Above Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal Flame (UL Standard 1256).
4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
6. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
7. Compressive Strength per ASTM D1621:
a. 20 psi (138 kPa) nominal.
b. 20 psi (138 kPa) Grade 2.
c. 25 psi (172 kPa) Grade 3.
8. LTTR-Value per ASTM C518: R-8.6 minimum at thickness of 1.5 inches (38 mm) and R-17.4 minimum at thickness of 3 inches (76 mm).
9. Tapered Insulation LTTR-Value per ASTM C518: As determined by average thickness of panel.
10. Required Insulation Thickness and R-value: As indicated on the Drawings.
11. Tapered Insulation: Utilize tapered insulation as indicated on drawings to create required roof slopes.
a. Tapered Insulation Slope: 1/8 inch per foot (10 mm per m).
b. Tapered Insulation Slope: 1/4 inch per foot (21 mm per m).
c. Tapered Insulation Slope: 1/2 inch per foot (42 mm per m).

I. Inorganic Polymer Coated Glass Fiber Mat-Faced (CGF), Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type II, Class 2, rigid, cellular, polyisocyanurate thermal insulation.
1. Basis of Design: Re-Cover Board-3 (CGF) from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
a. Flame: 25 to 60.
b. Smoke: 75 to 160.
3. Above Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal Flame (UL Standard 1256).
4. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
5. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
6. Compressive Strength per ASTM D1621:
a. 20 psi (138 kPa) nominal.
b. 20 psi (138 kPa) Grade 2.
c. 25 psi (172 kPa) Grade 3.
7. LTTR-Value per ASTM C518: R-5.7 minimum at thickness of 1 inch (25 mm) and R-8.0 minimum at thickness of 1.40 inches (36 mm).
8. Required Insulation Thickness and R-value: As indicated on the Drawings.

J. High-Density 1/2 inch (13 mm) Cover Board Composed of a Closed-Cell Polyisocyanurate-Foam Core Bonded to Inorganic Polymer Coated Glass Fiber Mat-Facers (CGF),: ASTM

C1289, Type II, Class 4, Grade 1, rigid, cellular, polyisocyanurate thermal insulation.

1. Basis of Design: Ultra-Max HD from Rmax.
2. Flame Spread Index and Smoke Contribution per ASTM E84:
   a. Flame: 60 or less.
   b. Smoke: 170 or less.
3. Above-Deck Roof Assembly Fire Classification: Underwriters laboratories classification, Class A for External Flame (UL Standard 790), and Class A for Internal Flame (UL Standard 1256).
4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Hail Classification: FM Severe Hail Rated.
6. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
7. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
8. Compressive Strength per ASTM D1621: Grade 1.
9. Thickness: 0.50 inches (13 mm).
10. LTTR-Value per ASTM C518: R-2.5 at 0.50 inches thickness.

2.6 POLYISOCYANURATE FOAM-PLASTIC COMPOSITE NAIL BASE ROOF INSULATION

A. Nailable Surfaced Polyisocyanurate-Foam Roof Insulation: ASTM C1289, Type V rigid, cellular, polyisocyanurate thermal insulation. Incorporates a wood structural panel of plywood conforming to APA PS 1, Exposure 1 (CDX), or OSB conforming to APA PS 2.

1. Basis of Design: Nailable Base-3 from Rmax.
2. Insulation Component:
   a. Type II, Class 1, glass fiber/organic mat-faced (GRF).
   b. Type II, Class 2,polymer-coated glass mat faced (CGF).
3. Flame Spread Index and Smoke Contribution of foam core and facer per ASTM E84:
   a. Flame: 25 to 60.
   b. Smoke: 75 to 160.
4. Above-Deck Thermal Insulation Compliance: Class 1 roofing insulation per FM Standard 4450/4470 at 1.5 inches (38 mm) minimum thickness.
5. Water Vapor Permeability per ASTM E96 desiccant method: 1.5 perm or less.
6. Air Permeability per ASTM E2178: 0.004 cfm per sq ft (1.2192 L per min per sq m) or less.
7. Compressive Strength per ASTM D1621:
   a. 20 psi (138 kPa) nominal.
   b. 20 psi (138 kPa) Grade 2.
   c. 25 psi (172 kPa) Grade 3.
8. LTTR-Value per ASTM C518: R-8.6 minimum at thickness of 1.5 inches (38 mm) of insulation and R-17.4 minimum at thickness of 3 inches (76 mm) of insulation.
9. Required Insulation Thickness and R-value: As indicated on the Drawings.
10. Nailable Panel Material and Thickness:
    a. Oriented-Strand-Board Thickness: 7/16 inch (11 mm).
    b. Oriented-Strand-Board Thickness: 1/2 inch (13 mm).
    c. Oriented-Strand-Board Thickness: 5/8 inch (16 mm).
    d. Oriented-Strand-Board Thickness: 3/4 inch (19 mm).
    e. Plywood Nominal Thickness, Exposure 1: 1/2 inch (12.7 mm).
    f. Plywood Nominal Thickness, Exposure 1: 5/8 inch (15.9 mm).
    g. Plywood Nominal Thickness, Exposure 1: 3/4 inch (195.1 mm).
    h. Fire-Retardant-Treated Plywood, Exposure 1: 1/2 inch (13 mm).
    i. Fire-Retardant-Treated Plywood, Exposure 1: 5/8 inch (16 mm).
    j. Fire-Retardant-Treated Plywood, Exposure 1: 3/4 inch (19 mm).

2.7 ACCESSORIES

A. Insulation Fastener Components:
   1. General - Fasteners for Fastening Polyisocyanurate Wall Insulation to Wood Framing Components, Light Gauge Metal Wall Framing Components and Wood and Metal Roof Decks:
      a. Steel drill screws, in type and length recommended by insulating sheathing manufacturer for thickness of insulating sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117. Fasteners in contact with fire-retardant-treated wood shall be of suitable material or provided with coating suitable for such use.
      b. Provide washers or plates if recommended by insulating sheathing manufacturer. Washers shall be compatible with screw fasteners.
   2. Fasteners for Fastening Polyisocyanurate Wall Insulation to metal stud framed wall surfaces:
      a. Self-drilling ceramic coated screw.
         1) Product: Rodenhouse Grip-Deck screws or comparable products.
   3. Nailboard Fasteners: Engineered for attaching nail base wall and roof panels to wood and metal framing and structural decks.
      a. Large-diameter, low profile pancake head, case hardened and tempered carbon steel, epoxy e-coat to comply with governing standards for use with treated wood including fire-retardant-treated wood.
         1) Product: TurFast; Nailboard Fasteners or comparable product.
      b. Thread Style and Point:
         1) SIPTP: Thread-point for wood and timber applications.
         2) SIPLD: Light-duty. Drill point for light gauge metal framing, corrugated steel deck, and wood applications.
         3) SIPHD: Heavy-duty. Drill point for thick steel member applications.
   4. Fasteners for Fastening Polyisocyanurate Wall Insulation to Concrete or Masonry Wall Surfaces:
      a. One-piece plastic washer and stem, installed in pre-drilled hole in concrete or masonry.
         1) Product: Rodenhouse Plasti-Grip PMF Plastic Masonry Fastener or comparable product.
   5. Washers: Self-sealing for use with Self-drilling screws:
      a. Self-sealing 2 inches (51 mm) diameter polymer washer, UV stabilized, tested, and approved to provide air and water-resistive seal, in combination with compatible self-drilling screw.
         1) Product: Rodenhouse Thermal-Grip ci prong washer or comparable product.
   6. Washers: Self-sealing for use with barrel style brick ties:
      a. Self-sealing 2 inches (51 mm) diameter UV stabilized polymer washer tested and approved to provide air and water-resistive seal, barrel-style brick ties.
         1) Product: Rodenhouse Thermal-Grip brick tie washer or comparable product.
   7. Washers: Perforated washers for use with self-drilling screws:
      a. Perforated face washers 1.75 inch (44 mm) diameter polymer washer, with additives for extended UV exposure for use in combination with compatible self-drilling screw.
         1) Product: Rodenhouse Plasti-Grip ci prong washer or comparable product.
   8. Washers: Perforated Hurricane/High-Wind washers for use with self-drilling screws:
      a. Perforated face washers 3.0 inch diameter polymer washer, with additives for extended UV exposure for use in combination with compatible self-drilling ceramic coated screw.
         1) Product: Rodenhouse Grip-Lok hurricane washer or comparable product.

B. Insulation Joint and Flashing Components:
   1. General - Joint Treatment and Flashing Components:
      a. Material Standards:
         1) AAMA 711: For self-adhered flashing and joint materials.
         2) AAMA 714: For liquid applied flashing and joint materials.
      b. Components for use at static joints, joining adjacent aluminum-faced insulation panels include liquid flashing, adhered joint tape, and adhered flashing and transition tape.
      c. Components for use at static joints, joining aluminum-faced insulation and adjacent elements, including window and wall openings and items penetrating the insulation include: liquid flashing and adhered flashing and transition tape.
      d. Components for use at dynamic joints at aluminum-faced insulation of up to 3/4 inch (19 mm) in width, shall be restricted to the use of flashing and transition tape, or materials and devices specifically designed to allow for dynamic movement.
      e. Components for use at dynamic joints over 3/4 inch (19 mm) in width, shall be restricted to the use of materials and devices specifically designed for such joint widths.
   2. Liquid Flashing for Stationary Joint Treatment of Foil Faced Polyisocyanurate Insulation:
      a. Product: Rmax R-SEAL 2000 LF sealant or comparable product.
         1) One-component flexible flashing and water-resistive barrier sealant.
         2) ASTM C920, Type S, Grade NS, Class 12.5, use NT, G, A, O, M.
         3) Application Temperature Range: 40 to 104 degrees F (4 to 40 degrees C).
         4) Service Range: -40 to 170 degrees F (-40 to 77 degrees C).
         5) Curing Rate:
            a) Skin Formation Time: 60 to 90 minutes.
            b) Cure Depth: 0.16 inch (4 mm) in 24 hours.
   3. Joint Sealant Tape for Stationary Joint Treatment of Foil Faced Polyisocyanurate Insulation:
      a. Product: Rmax R-SEAL 3000 tape or comparable product.
         1) Dead soft aluminum foil coated with acrylic pressure-sensitive adhesive.
         2) Width: 4 inches (102 mm)
         3) Width: 5 inches (127 mm) for use where coverage is necessary.
         4) Width: 5 inches (127 mm) for systems involving High-Velocity Hurricane Zones.
   4. Joint Sealant Tape for Stationary Joint Treatment of White Finished Foil Faced Polyisocyanurate Insulation:
      a. Product: Rmax R-SEAL 3000W tape, or comparable product.
         1) Dead soft white aluminum foil coated with acrylic pressure-sensitive adhesive.
         2) Width 3 inches (76 mm).
   5. Flashing and Transition Tape for Joints Subject to Movement and Openings at Foil Faced Polyisocyanurate Insulation, and transition to other building materials.
      a. Product: Rmax R-SEAL 6000 tape or comparable product.
         1) Polyethylene membrane with butyl rubber adhesive.
         2) Width 9 and 12 inches (229 and 305 mm).
   6. Joint Sealant Tape for Stationary Joint Treatment of Foil Faced Polyisocyanurate Insulation, in Residential and Light Commercial Construction:
      a. Product: Rmax R-SEAL Construction Tape or comparable product.
         1) White translucent OOP Film with acrylic pressure-sensitive adhesive.
         2) Width 3 inches (76 mm).

C. Interior Insulation Attachment and Joint Closure System:
   1. At Interior Installation of Foil Faced Polyisocyanurate Insulation over interior wall

surfaces of buildings, provide in conformance with the following:
   a. Components to be PVC extrusions, white in color, with flexible edge seal, and perforated fastening leg. Flame Spread Index of 0 and Smoke-Developed Index of 190, per UL 723.
2. Two-Component System for Interior Installation of Foil Faced Polyisocyanurate Insulation; provide in conformance with the following:
   a. Two-component system, consisting of male component for attachment to wall or framing surface, and T-shaped female component, to be installed over face of insulation panels; allowing for removal and replacement of insulation panels if necessary.
   b. Product: Victory Bear; Flex-Tite Clip System or comparable product.
3. One Component System for Interior Installation of Foil Faced Polyisocyanurate Insulation; provide in conformance with the following:
   a. One component system, of size appropriate to the insulation thickness, with flanges for attachment to wall or framing surface; allowing for insulation panels to be installed progressively.
   b. Product: Victory Bear; Quick Clip System or comparable product.
4. Perimeter Trim Component for Interior Installation of Foil Faced Polyisocyanurate Insulation; provide in conformance with the following;
   a. J-Channel of size appropriate to the insulation thickness to be installed; intended to secure and conceal exposed edges of insulation panels.
   b. Product: Victory Bear; Flex-Tite J-Channel or comparable product.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

3.3 INSTALLATION, GENERAL

A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION