



SECTION 07210

BUILDING INSULATION

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PART 1 GENERAL

1.1 SECTION INCLUDES

**** NOTE TO SPECIFIER ** Delete items below not required for project.**

- A. Extruded polystyrene insulation board (XPS) Type IV.
- B. Extruded polystyrene insulation board (XPS) Type VI.
- C. Extruded polystyrene insulation board (XPS) Type VII.
- D. Low GWP extruded polystyrene insulation board (XPS) Type IV.
- E. Low GWP extruded polystyrene insulation board (XPS) Type VI.
- F. Low GWP extruded polystyrene insulation board (XPS) Type VII.

1.2 RELATED SECTIONS

**** NOTE TO SPECIFIER ** Delete any sections below not relevant to this project; add others as required.**

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 04 20 00 - Unit Masonry.
- C. Section 04 21 13 - Brick Masonry.
- D. Section 06 16 36 - Wood Panel Product Sheathing.
- E. Section 06 16 36 - Wood Panel Product Sheathing.
- F. Section 07 10 00 - Dampproofing and Waterproofing.
- G. Section 07 21 16 - Blanket Insulation.
- H. Section 07 24 00 - Exterior Insulation and Finish Systems
- I. Section 07 26 23 - Below-Grade Gas Retarders.
- J. Section 07 26 23 - Below-Grade Gas Retarders.

- K. Section 07 27 23 - Board Product Air Barriers.
- L. Section 07 28 00 - Underlayments*.
- M. Section 07 40 00 - Roofing and Siding Panels.
- N. Section 07 46 16 - Aluminum Siding.
- O. Section 07 50 00 - Membrane Roofing
- P. Section 07 60 00 - Flashing and Sheet Metal.
- Q. Section 07 55 63 - Vegetated Protected Membrane Roofing.
- R. Section 07 76 13 - Roof Ballast Pavers.
- S. Section 07 84 13 - Penetration Firestopping.
- T. Section 09 25 23 - Lime Based Plastering.
- U. Section 13 24 66 - Athletic Rooms.

1.3 REFERENCES

**** NOTE TO SPECIFIER ** Delete references from the list below that are not actually required by the text of the edited section.**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
- D. CAN/ULC-S701 - Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Submit insulation manufacturer's product data, building code compliance reports or test reports and the insulation manufacturer's printed installation guidelines.
 1. Submit product literature or a letter from the insulation manufacturer indicating approval of products not manufactured by the specified insulation manufacturer.
 2. If a letter is submitted, it shall include a statement that materials are compatible with adjacent materials proposed for use.
- C. Samples: Submit clearly labeled samples, 5 inches by 7 inches (127 mm by 177 mm) minimum size of each material specified.
- D. Shop Drawings of Wall Assembly Mock-Up: Submit shop drawings of proposed wall assembly mock-ups showing the location of the insulation board in the wall

assembly and location of all wall window and door openings, penetrations and terminations involving structures attached to the exterior wall, i.e., decks, shelf angles, roof-wall intersections, etc.

1.5 QUALITY ASSURANCE

- A. Insulation Manufacturer: Obtain insulation board from a single manufacturer regularly engaged in manufacturing the extruded polystyrene insulation board (XPS) type specified. Obtain secondary materials from a source acceptable to the primary insulation manufacturer.
- B. Accredited Laboratory Testing for XPS insulation board: Laboratory accredited by International Accreditation Service Inc. (IAS), American Association for Laboratory Accreditation (A2LA), or the Standards Council of Canada (SCC).
- C. Installer qualifications:
 - 1. Installer shall have experience with installation of insulation board; and installation shall be in accordance with insulation manufacturer's installation guidelines.
 - 2. Minimum 2 year experience installing similar products.

**** NOTE TO SPECIFIER ** Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.**

- D. Wall Assembly Mock-Up: Build a mock-up representative of primary exterior wall assemblies using all specified insulation and other related auxiliary materials following the insulation manufacturer's installation guidelines. Mock-up shall be approximately 8 feet long by 8 feet high (2.4 m by 2.4 m) and include all components in the exterior wall assembly.

1.6 PRE-INSTALLATION MEETINGS

- A. Preconstruction Meeting: Convene a minimum of two weeks prior to commencing work of this Section. Agenda shall include, at a minimum, review of wall assembly mock-up drawings, sequence of construction, coordination with substrate preparation, materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver insulation board to the project site in original packaging, labeled with manufacturer's information, product name, and date of manufacture, and instructions for storage.
- B. Store insulation board in its original undamaged packaging or in a clean, dry, protected location and within temperature range required by insulation manufacturer. Protect stored materials from direct sunlight.
- C. Handling: Handle materials to avoid damage.

1.8 PROJECT CONDITIONS

- A. Temperature: Install insulation board within range of ambient and substrate temperatures recommended by the insulation manufacturer. Do not apply insulation board to a damp or wet substrate.
- B. Field Conditions: Do not install insulation board in snow, rain, fog, or mist. Do not install insulation board or auxiliary materials when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the insulation and auxiliary material manufacturers.

1.9 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
- B. Review requirements for sequencing of installation of the insulation board with installation of windows, doors, louvers and flashing materials to ensure a weather-tight air barrier assembly.
- C. Schedule installation of exterior cladding within one month of installation of the insulation board.

1.10 WARRANTY

**** NOTE TO SPECIFIER ** Verify warranty length with the insulation manufacturer.**

- A. Material Warranty: Provide insulation manufacturer's warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Kingspan Insulation LLC, which is located at: 2100 riverEdge Pkwy. Suite 175; Atlanta, GA 30328; Toll Free Tel: 800-241-4402; Tel: 678-589-7300; Fax: 678-589-7325; Email: request info (info@kingspaninsulation.us); Web: www.kingspaninsulation.us

**** NOTE TO SPECIFIER ** Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.**

- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 PERFORMANCE REQUIREMENTS

- A. Material Performance, Thermal Insulation: Provide extruded polystyrene insulation board (XPS) that meets the requirements of ICC-ES AC12, "Acceptance Criteria for Foam Plastic Insulation", ASTM C578, Type IV, Type VI and Type VII, and CAN/ULC-S701, Type 4.
- B. Mechanically-fastened, Air Barrier Material: Provide extruded polystyrene insulation board (XPS) with an air permeance not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3 in. water (1.57 psf) (0.02 L/s/m² @ 75 Pa.) when tested in accordance with ASTM E 2178 and shall meet the

requirements of CCMC Technical Guide 07273, "Air Barrier Materials" and test reports from accredited testing laboratories shall be made available upon request.

- C. Material Performance, Alternate Water-resistive Barrier: Provide extruded polystyrene insulation board (XPS) that meets the requirements of ICC-ES AC71, "Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water-resistive Barriers" and test reports from accredited testing laboratories shall be made available upon request.
- D. Connections to Adjacent Materials: Provide connections to prevent air leakage at the following locations:
 - 1. Walls, including penetrations, ties and anchors;
 - 2. Walls, windows, curtain walls or doors;
 - 3. Different wall assemblies, and fixed openings within those assemblies;
 - 4. Wall and roof connections;
 - 5. Wall control and expansion joints;
 - 6. Wall pipe and duct penetrations; and
 - 7. Wall seismic and expansion joints.

2.3 EXTRUDED POLYSTYRENE INSULATION BOARD (XPS)

- A. Extruded Polystyrene Insulation Board (XPS): Subject to compliance with requirements described in Section 1.2 provide one the following:

**** NOTE TO SPECIFIER ** Delete insulation type not required.**

- 1. Kingspan GreenGuard XPS Insulation Board CM (square edges 1/2 inch to 4 inches (13 mm to 76 mm) Type IV and 1.5 inches to 4 inches (38 mm to 101 mm) Type VI and Type VII).
- 2. Kingspan GreenGuard XPS Insulation Board SB (scored board: 1 inch to 3 inches (25 mm to 51 mm), Type IV).
- 3. Kingspan GreenGuard XPS Insulation Board DC (drainage channels, 1.5 to 3 inches (38 mm to 101 mm) Type VI and Type VII).
- 4. Kingspan GreenGuard XPS Insulation Board SL (shiplap edges, 1/2 inch to 2 inches (13 mm to 51 mm) Type IV).
- 5. Kingspan GreenGuard SLX Sheathing (film-faced, shiplap edges, 1/2 inch to 1 inch (13 mm to 25 mm) Type IV).
- 6. Kingspan GreenGuard Type VII XPS Insulation Board (square edges, 1 1/2 inch to 3 inch (38 mm to 51 mm) Type VII)

2.4 LOW GWP EXTRUDED POLYSTYRENE INSULATION BOARD (XPS)

- A. Performance Requirements:
 - 1. Global Warming Potential (GWP): Less than 50.
- B. Low GWP Extruded Polystyrene Insulation Board (XPS): Subject to compliance with requirements described in Section 1.2 provide one the following:

**** NOTE TO SPECIFIER ** Delete insulation type not required.**

- 1. Kingspan GreenGuard GG25-LG XPS Insulation Board:
 - a. Type: ASTM C578, Type IV.
 - b. Compressive Strength, ASTM D1621: 25 psi (172 kPa).

**** NOTE TO SPECIFIER ** Delete edge option not required.**

- c. Edges: Square.
- d. Edges: Shiplap.

- e. Edges: Scored

**** NOTE TO SPECIFIER ** Delete board thickness options not required.**

- f. Board Thickness: 1/2 inch (13 mm).
 - g. Board Thickness: 3/4 inch (19 mm).
 - h. Board Thickness: 1 inch (25 mm).
 - i. Board Thickness: 1-1/2 inches (38 mm).
 - j. Board Thickness: 2 inches (51 mm).
 - k. Board Thickness: 2-1/2 inches (64 mm).
 - l. Board Thickness: 3 inches (76 mm).
 - m. Board Thickness: 4 inches (101 mm).
- 2. Kingspan GreenGuard GG40-LG XPS Insulation Board:
 - a. Type: ASTM C578, Type VI.
 - b. Compressive Strength, ASTM D1621: 40 psi (276 kPa).
 - c. Edges: Square.
 - d. Edges: Drainage

**** NOTE TO SPECIFIER ** Delete board thickness options not required.**

- e. Board Thickness: 2 inches (51 mm).
 - f. Board Thickness: 3 inches (76 mm).
 - g. Board Thickness: 4 inches (101 mm).
- 3. Kingspan GreenGuard GG60-LG XPS Insulation Board:
 - a. Type: ASTM C578, Type VII.
 - b. Compressive Strength, ASTM D1621: 60 psi (414 kPa).
 - c. Edges: Square.
 - d. Edges: Drainage

**** NOTE TO SPECIFIER ** Delete board thickness options not required.**

- e. Board Thickness: 1-1/2 inches (38 mm).
- f. Board Thickness: 2 inches (51 mm).
- g. Board Thickness: 3 inches (76 mm).

2.5 AUXILIARY MATERIALS

**** NOTE TO SPECIFIER ** Specify auxiliary materials as shown below or other alternative materials approved by the insulation manufacturer: Delete materials not required.**

- A. Kingspan GreenGuard Standard Seam Tape and / or Custom Seam Tape.
- B. Kingspan GreenGuard Butyl Flashing and / or Kingspan GreenGuard SuperStretch Butyl Flashing.
- C. Adhesives, Sealants and Primers: Adhesives, sealants and primers shall be compatible with the insulation board. Adhesives, sealants and primers referenced in the Kingspan Insulation LLC TB-011 and other products approved by the insulation manufacturer shall be acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which the insulation board will be applied, with installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

- B. Review requirements for sequencing of installation of all wall assembly components as demonstrated in the mock-up wall assembly.

**** NOTE TO SPECIFIER ** Delete if not required.**

3.2 INSTALLATION - BELOW-GRADE, SLAB-ON-GRADE INSULATION

**** NOTE TO SPECIFIER ** The installation information provided in this section describes some common applications and represents current industry practice. This information is intended to be used as a guide. for information regarding other applications and for more detailed installation information go to www.kingspaninsulation.us . Alternate installation details may be used if approved in writing by Kingspan Insulation LLC prior to installation.**

- A. Place a 6-mil polyethylene vapor retarder sheet over graded, smooth dry, well tamped fill. Lap sheet a minimum of 2 inches (51 mm) and extend vertically up the perimeter foundation wall a minimum of 2 inches (51 mm).
- B. Lay insulation boards over the vapor retarder sheet, cutting to size as necessary. Adjacent insulation boards shall be installed with joints staggered. Subsequent layers of insulation board shall be installed over the lower layer with board joints staggered.
- C. Use sealant to seal gaps between the insulation board and the perimeter foundation wall. Apply sealant as recommended by the sealant manufacturer.
- D. Place concrete over the insulation board and allow to cure before applying loads.

**** NOTE TO SPECIFIER ** Delete if not required.**

3.3 INSTALLATION - BELOW-GRADE, PERIMETER FOUNDATION INSULATION

**** NOTE TO SPECIFIER ** The installation information provided in this section describes some common applications and represents current industry practice. This information is intended to be used as a guide. for information regarding other applications and for more detailed installation information go to www.kingspaninsulation.us . Alternate installation details may be used if approved in writing by Kingspan Insulation LLC prior to installation.**

- A. Install insulation board to the exterior side of masonry walls after the waterproofing membrane has cured according to the manufacturer's installation instructions. If the surface of the cured waterproofing membrane is not sufficiently tacky to hold the insulation board in place until backfilling takes place, then an adhesive shall be used to secure the insulation board to the wall. Apply adhesive to the insulation board as recommended by the adhesive manufacturer using the amount and pattern required for the application.
- B. Place backfill directly in contact with the insulation board. Remove all large rocks and other debris that may damage insulation board during backfilling.
- C. Do not leave insulation boards exposed above grade. If insulation board is exposed above the grade line, then it shall be covered with an exterior cladding material or foundation covering.

**** NOTE TO SPECIFIER ** Delete if not required.**

3.4 INSTALLATION - CAVITY WALL INSULATION

**** NOTE TO SPECIFIER ** The installation information provided in this section describes some common applications and represents current industry practice. This information is intended to be**

used as a guide. for information regarding other applications and for more detailed installation information go to www.kingspaninsulation.us . Alternate installation details may be used if approved in writing by Kingspan Insulation LLC prior to installation.

- A. Install insulation board against the masonry wall using an adhesive or by friction fitting boards between masonry wall ties. When an adhesive is used, apply the adhesive using the amount and pattern recommended by the adhesive manufacturer.
- B. Adjacent insulation board seams shall be staggered and all board edges shall be firmly butted together.
- C. Install the exterior veneer in accordance with the manufacturer's installation instructions.

**** NOTE TO SPECIFIER ** Delete if not required.**

3.5 INSTALLATION - FRAMED WALLS - EXTERIOR INSULATING SHEATHING AND ALTERNATE WRB / AIR BARRIER

**** NOTE TO SPECIFIER **** The installation information provided in this section describes some common applications and represents current industry practice. This information is intended to be used as a guide. for information regarding other applications and for more detailed installation information go to www.kingspaninsulation.us . Alternate installation details may be used if approved in writing by Kingspan Insulation LLC prior to installation.

**** NOTE TO SPECIFIER **** If the insulation board is intended to perform as an alternate WRB in lieu of building wrap, additional steps shall be followed to seal all penetrations, tape board seams and to seal around window and door openings using self- adhering flashing. If a building wrap is used as the WRB, then it may be installed either before or after the insulation board is installed. Follow the WRB manufacturer's installation instructions.

- A. Begin by aligning the first board at a corner of the structure making sure that the bottom of the board overlaps the sill plate. When installing the insulation board as a WRB or air barrier, apply a bead of sealant along the face of the sill plate and press the insulation board into the sealant bead to form a seal.
- B. Insulation boards shall be installed with the board length in the vertical direction on the wall. Vertical joints shall be located over framing members.
- C. Attach the insulation board using fasteners that are appropriate for the framing type. Refer to the Kingspan Insulation LLC Insulation Installation Guide for requirements of the applicable fastener type and spacing requirements.
- D. Seal all gaps, penetrations and repair damaged areas by using a silicone sealant complying with ASTM C920, Type S, Grade NS, Class 25, or expanding spray foam complying with AAMA 812, or either Kingspan GreenGuard Seam Tape or Kingspan GreenGuard Butyl Flashing.
- E. If the insulation board is intended to be used as an alternate WRB or air barrier, then tape seams using Kingspan GreenGuard Seam Tape and use Kingspan GreenGuard Butyl Flashing to seal around doors, windows and other wall penetrations. Use of other seam tape and self-adhering flashings shall approved by Kingspan Insulation LLC prior to installation.

- F. Install the exterior siding or cladding in accordance with the manufacturer's installation instructions. Refer to Table R703.4 of the International Residential Code (IRC) for attachment requirements for siding materials.

**** NOTE TO SPECIFIER ** Delete if not required.**

3.6 INSTALLATION - EXTERIOR INSULATION FINISH SYSTEMS (EIFS)

**** NOTE TO SPECIFIER **** The installation information provided in this section describes some common applications and represents current industry practice. This information is intended to be used as a guide. for information regarding other applications and for more detailed installation information go to www.kingspaninsulation.us . Alternate installation details may be used if approved in writing by Kingspan Insulation LLC prior to installation.

- A. Before proceeding with installation, contact the EIFS manufacturer to confirm that the insulation board is recognized for use with the specified EIFS.
- B. Install the insulation board as specified for WRB installation.
- C. Install the EIFS in accordance with the manufacturer's installation guidelines.

**** NOTE TO SPECIFIER ** Delete if not required.**

3.7 INSTALLATION - CURTAIN WALL INSULATION

**** NOTE TO SPECIFIER **** The installation information provided in this section describes some common applications and represents current industry practice. This information is intended to be used as a guide. for information regarding other applications and for more detailed installation information go to www.kingspaninsulation.us . Alternate installation details may be used if approved in writing by Kingspan Insulation LLC prior to installation.

- A. Install insulation board in curtain wall assemblies in accordance with the wall panel manufacturer's installation guidelines.
- B. Hold insulation boards in place by securing metal clips and straps or integral pockets within frames as indicated.
- C. Install the curtain wall panels in accordance with the manufacturer's installation instructions.

**** NOTE TO SPECIFIER ** Delete if not required.**

3.8 INSTALLATION - ROOF SYSTEM INSULATION

**** NOTE TO SPECIFIER **** The installation information provided in this section describes some common applications and represents current industry practice. This information is intended to be used as a guide. for information regarding other applications and for more detailed installation information go to www.kingspaninsulation.us . Alternate installation details may be used if approved in writing by Kingspan Insulation LLC prior to installation.

**** NOTE TO SPECIFIER **** Refer to the UL LLC (UL) Roofing Materials Guide and the FM Approvals "RoofNav" for approved roof assemblies that incorporate extruded polystyrene insulation board (XPS).

- A. Examine the roof deck for suitability to receive insulation board. Verify that the substrate is dry, clean and free of foreign materials that may damage insulation or impede installation.

- B. Verify that roof drains, scuppers, roof curbs, nailers, equipment supports, vents and other roof accessories are secured properly and installed in conformance with the Contract Documents and approved submittals.
- C. Start of installation indicates that the installer accepts the conditions of the roof deck surfaces.
- D. Do not proceed with work during inclement weather or install insulation board over wet surfaces.
- E. Install only as much insulation board as can be covered by the roofing materials in the same day.
- F. Install the insulation board in accordance with the manufacturer's installation guidelines for attachment, using the applicable fasteners and spacing.
- G. Install the roof covering materials in accordance with the manufacturer's installation guidelines and the applicable UL LLC or FM Approvals roof system listings.

**** NOTE TO SPECIFIER ** Delete if not required.**

3.9 FIELD QUALITY CONTROL

- A. Owner's Inspection and Testing: Cooperate with Owner's testing agency. Allow access to work areas and staging. Notify Owner's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection. Daily inspection and testing may be required. Do not cover Work of this section until testing and inspection is accepted.

3.10 PROTECTING AND CLEANING

- A. Protect insulation board from damage during installation and remainder of construction period, according to manufacturer's written instructions.
 - 1. Coordinate with installation of insulation board to ensure exposure periods do not exceed the manufacturer's recommendations.

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END OF SECTION