

SPEC NOTE: This guide specification is intended for use when specifying THERMAX™ polyisocyanurate rigid foam boards in pre-engineered metal buildings. This may include applications either above or below ceiling girts or purlins, to the underside of concrete ceiling slabs, to the face of concrete or masonry walls, etc.

SPEC NOTE: Make any required selections, such as insulation thickness, board sizes, etc. Where selection is indicated with an [OR] statement, select the appropriate paragraph and delete the inappropriate statement. Delete all SPEC NOTES and [OR] statements prior to final printing.

DISCLAIMER: The manufacturer has reviewed the product information contained in this guide specification. The information is organized and presented to assist the specification writer working on a construction project to select the appropriate products and to save time in writing the project specification Section. The specification writer is responsible for product selection as well as the use and application of this information, and should contact the manufacturer to ensure that all options are available and that the associated specification information is valid and correct.

SECTION 07 21 13.15

RIGID FOAM BOARD INSULATION FOR ENGINEERED BUILDINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Polyisocyanurate foam rigid board insulation, complete with [retaining clips][, trim][, tape] [and] [fasteners].

SPEC NOTE: Edit to suit project requirements.

1.02 RELATED SECTIONS

- A. Section 07 21 16 - Blanket Insulation.
- B. Section 07 22 16 - Roof Board Insulation.
- C. Section 07 26 00 - Vapor Retarders.
- D. Section 07 27 00 - Air Barriers.
- E. Section 07 41 13 - Metal Roof Panels.
- F. Section 07 42 13 - Metal Wall Panels.
- G. Section 07 92 00 - Joint Sealants.
- H. Section 09 29 00 - Gypsum Board.

I. Section 13 34 00 - Fabricated Engineered Structures.

SPEC NOTE: Edit the following Article in conjunction with the requirements of Part 2 - Products and Part 3 - Execution. Delete those reference standards not required by the Project.

1.03 REFERENCES

- A. ANSI/UL 1256-[02], Standard for Fire Test of Roof Deck Constructions.
- B. ASTM C209-[07], Standard Test Methods for Cellulosic Fiber Insulating Board.
- C. ASTM C518-[04], Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- D. [ASTM C920-[08], Standard Specification for Elastomeric Joint Sealants.]
- E. ASTM C1289-[10], Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- F. ASTM C1363-[05], Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
- G. ASTM D1621-[04a], Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- H. ASTM D1622-[08], Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- I. ASTM E84-[10], Standard Test Method for Surface Burning Characteristics of Building Materials.
- J. ASTM E96/E96M-[05], Standard Test Methods for Water Vapor Transmission of Materials.
- K. FM 4880-[2005], Approval Standard - Wall-Ceiling Construction Metal-faced Class 1 Rated to Max 30 ft (9.1 m) High.
- L. Federal Specification HH-I-1972/1, Class 2 Insulation Board, Thermal, Polyurethane or Polyisocyanurate, Faced with Aluminum Foil on Both Sides of the Foam.
- M. NFPA 285-[2006], Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus.

1.04 PERFORMANCE REQUIREMENTS

SPEC NOTE: Use this article primarily for performance specifying for thermal insulation, vapor retarder and air barrier materials. Do not duplicate statements made in SECTION INCLUDES article.

- A. Materials for This Section: Provide continuous thermal insulation [vapor retarder] [and] [air barrier] at pre-engineered building enclosure assemblies and spaces in conjunction with:
 - .1 Thermal insulating materials specified in Section [____ - ____];
 - .2 Vapor retarder materials specified in Section [07 26 00 - Vapor Retarders] [____ - ____], and ;
 - .3 Air barrier materials specified in Section [07 27 00 - Air Barriers] [____ - ____].
 - .4 FROTH-PAK™ Foam Insulation kits (Class A) for ceiling/roof to wall juncture [_____].

1.05 SUBMITTALS

- A. Submit Product data and manufacturer's installation instructions as specified in Section [01 00 00] [01 33 00] [_____].
- B. Product Data
 - .1 Provide manufacturer's technical data for [each type of] insulation.
 - .2 Include product characteristics and performance criteria: aged thermal resistance values, fire performance characteristics, moisture vapor permeance, water absorption ratings, compressive strengths, [evaluation reports showing conformance to applicable codes for insulation].
- C. Manufacturer's Installation Instructions: Indicate procedures for preparation and installation specific to the work of this Section.

SPEC NOTE: Request shop drawings only for very large or complex projects. Shop drawings add expense to the Project.

1.06 SHOP DRAWINGS

- A. Submit Shop Drawings for prefabricated work and details as specified in Section [01 00 00] [01 33 00] [_____].
- B. Shop Drawings: Include plans, sections, details in accordance with performance requirements, and for attachment to other portions of the Work. Indicate degree of slope and layout of sloping insulation on roof surfaces. Ensure positive drainage to roof drains.

SPEC NOTE: Only request a manufacturer's certificate when a regulatory agency requires it or when performance characteristics are critical.

1.07 CERTIFICATES

- A. Submit a manufacturer's certificate as specified in Section [01 78 00] [_____].
- B. Manufacturer's Certificate: stating that Products meet or exceed specified requirements.

1.08 REGULATORY REQUIREMENTS

SPEC NOTE: The use of foam insulations exposed or open to air spaces in plenums, cavities or voids may be subject to certain restrictions of codes for fire performance characteristics.

- A. Conform to [applicable] [_____] code for [combustibility] flame spread and smoke developed performance requirements of foam insulations.

1.09 MOCKUPS

SPEC NOTE: Use this article to request full sized erected assemblies required for review of construction, coordination of work of several sections, field testing, or education of specific trades. Coordinate with similar requirements of other sections listed in the RELATED SECTIONS article.

- A. Provide mockup as specified in Section [01 40 00] [01 43 00] [01 43 39] [_____].
- B. Mockup insulation for [wall cladding assembly] [roof assembly] [_____] part of pre-engineered building at [_____] location, to establish [construction techniques] [_____].
- C. Locate [where directed] [_____].
- D. Mockup may [not] remain as part of the Work.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver Product as specified in Section [01 60 00] [01 65 00] [_____].
- B. Store and handle Product as specified in Section [01 60 00] [01 66 00] [_____].
- C. Protect Product from moisture.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply adhesives or sealants when substrate and ambient air temperatures are below 40 degrees F (4 degrees C).

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers of rigid foam insulation systems having Products considered acceptable for use:
 - 1. The Dow Chemical Company - THERMAX™ Brand Insulation
 - 2. [_____].
 - 3. [_____].
- B. Substitution Procedures: refer to Section [01 00 00][01 25 00][_____].

2.02 MATERIALS

SPEC NOTE: Select one or more of the following Products to suit project requirements. Refer to THERMAX™ product literature for product selection criteria. For additional information, contact your local Dow Product Representative.

SPEC NOTE: Specify square edged product when using the PVC joint closure systems. Otherwise specify shiplapped edges (sealant and tape of shiplapped board joints).

- A. Rigid Foam Board Insulation: closed cell polyisocyanurate foam board with glass fiber reinforced core, to [ASTM C1289, Type I, Class 2] [and] [Federal Specification HH-I-1972/1, Class 2]; meeting the following criteria:
1. Thermal Resistance [(ASTM C1363 @ 75 deg. F)] [(ASTM C518 @ 75 deg. F)]: R-6.5 per 1 inch of thickness (RSI 1.14 per 25 mm of thickness).
 2. Density (ASTM D1622): nominal 2.0 pcf.
 3. Compressive Strength (ASTM D1621): minimum 25 psi.
 4. Board Sizes: 48 inches (1,220 mm) wide, [96 inches (2,440 mm)] [120 inches (3,050 mm)] [144 inches (3,660 mm)] long.
 5. Board Thickness: [1 inch (25 mm)] [2 inches (50 mm)] [3 inches (75 mm)] [4.25 inches (108 mm)] [as indicated on Drawings].
 6. Board Edges: [Square] [Shiplapped].
 7. Faces: 1.0 mil (0.025 mm) thick aluminum foil facer, both sides.
 8. Foam Surface Burning Characteristics (ASTM E84): flame spread \leq 25, smoke developed \leq 450.
 9. Water Vapor Transmission (ASTM E96): less than 0.03 perms.
 10. Water Absorption by Volume (ASTM C209): maximum 0.3 percent.
 11. Product and Manufacturer Name: THERMAX™ Insulation Sheathing by The Dow Chemical Company.

[OR]

- A. Rigid Foam Board Insulation: closed cell polyisocyanurate foam board with glass fiber reinforced core, to [ASTM C1289, Type I, Class 2] [and] [Fed. Spec. HH-I-1972/1, Class 2]; meeting the following criteria:
1. Thermal Resistance [(ASTM C1363 @ 75 deg. F)] [(ASTM C518 @ 75 deg. F)]: R-6.5 per 1 inch of thickness (RSI 1.14 per 25 mm of thickness).
 2. Density (ASTM D1622): nominal 2.0 pcf.
 3. Compressive Strength (ASTM D1621): minimum 25 psi.
 4. Board Sizes: 48 inches (1,220 mm) wide, [96 inches (2,440 mm)] [120 inches (3,050 mm)] [144 inches (3,660 mm)] long.
 5. Board Thickness: [½ inch (13 mm)] [1 inch (25 mm)] [2 inches (50 mm)] [3 inches (75 mm)] [as indicated on Drawings].
 6. Board Edges: [Square] [Shiplapped].
 7. Faces: 1.25 mil (0.032 mm) plain embossed aluminum on both sides.
 8. Foam Surface Burning Characteristics (ASTM E84): flame spread \leq 25, smoke developed \leq 450.
 9. Water Vapor Transmission (ASTM E96): less than 0.03 perms.
 10. Water Absorption by Volume (ASTM C209): maximum 0.3 percent.
 11. Product and Manufacturer Name: THERMAX™ Metal Building Board by The Dow Chemical Company.

[OR]

- A. Rigid Foam Board Insulation: closed cell polyisocyanurate foam board with glass fiber reinforced core, to [ASTM C1289, Type I, Class 2] [and] [Fed. Spec. HH-I-1972/1, Class 2]; meeting the following criteria:
1. Thermal Resistance [(ASTM C1363 @ 75 deg. F)] [(ASTM C518 @ 75 deg. F)]: R-6.5 per 1 inch of thickness (RSI 1.14 per 25 mm of thickness).
 2. Density (ASTM D1622): nominal 2.0 pcf.
 3. Compressive Strength (ASTM D1621): minimum 25 psi.
 4. Board Sizes: 48 inches (1,220 mm) wide, [96 inches (2,440 mm)] [120 inches (3,050 mm)] [144 inches (3,660 mm)] long.
 5. Board Thickness: [½ inch (13 mm)] [1 inch (25 mm)] [2 inches (50 mm)] [3 inches (75 mm)] [as indicated on Drawings].
 6. Board Edges: [Square] [Shiplapped].
 7. Faces: 1.25 mil (0.032 mm) thick white embossed aluminum facer one side, and a 1.0 mil (0.025 mm) thick plain aluminum facer on the other side.
 8. Foam Surface Burning Characteristics (ASTM E84): flame spread ≤ 25 , smoke developed ≤ 450 .
 9. Water Vapor Transmission (ASTM E96): less than 0.03 perms.
 10. Water Absorption by Volume (ASTM C209): maximum 0.3 percent.
 11. Product and Manufacturer Name: THERMAX™ White Finish Insulation Board by The Dow Chemical Company.

[OR]

- A. Rigid Foam Board Insulation: closed cell polyisocyanurate foam board with glass fiber reinforced core, to [ASTM C1289, Type I, Class 2] [and] [Fed. Spec. HH-I-1972/1, Class 2]; meeting the following criteria:
1. Thermal Resistance [(ASTM C1363 @ 75 deg. F)] [(ASTM C518 @ 75 deg. F)]: R-6.5 per 1 inch of thickness (RSI 1.14 per 25 mm of thickness).
 2. Density (ASTM D1622): nominal 2.0 pcf.
 3. Compressive Strength (ASTM D1621): minimum 25 psi.
 4. Board Sizes: 48 inches (1,220 mm) wide, [96 inches (2,440 mm)] [120 inches (3,050 mm)] [144 inches (3,660 mm)] long.
 5. Board Thickness: [½ inch (13 mm)] [1 inch (25 mm)] [2 inches (50 mm)] [3 inches (75 mm)] [as indicated on Drawings].
 6. Board Edges: [Square] [Shiplapped].
 7. Faces: 1.25 mil (0.032 mm) thick white embossed aluminum facer one side, and a 1.25 mil (0.032 mm) thick plain embossed aluminum facer on the other side.
 8. Foam Surface Burning Characteristics (ASTM E84): flame spread ≤ 25 , smoke developed ≤ 450 .
 9. Water Vapor Transmission (ASTM E96): less than 0.03 perms.
 10. Water Absorption by Volume (ASTM C209): maximum 0.3 percent.
 11. Product and Manufacturer Name: THERMAX™ Light Duty Insulation Board by The Dow Chemical Company.

[OR]

- A. Rigid Foam Board Insulation: closed cell polyisocyanurate foam board with glass fiber reinforced core, to [ASTM C1289, Type I, Class 2] [and] [Fed. Spec. HH-I-1972/1, Class 2]; meeting the following criteria:
1. Thermal Resistance [(ASTM C1363 @ 75 deg. F)] [(ASTM C518 @ 75 deg. F)]: R-6.5 per 1 inch of thickness (RSI 1.14 per 25 mm of thickness).
 2. Density (ASTM D1622): nominal 2.0 pcf.
 3. Compressive Strength (ASTM D1621): minimum 25 psi.
 4. Board Sizes: 48 inches (1,220 mm) wide, [96 inches (2,440 mm)] [120 inches (3,050 mm)] [144 inches (3,660 mm)] long.
 5. Board Thickness: [½ inch (13 mm)] [1 inch (25 mm)] [2 inches (50 mm)] [3 inches (75 mm)] [as indicated on Drawings].
 6. Board Edges: [Square] [Shiplapped].
 7. Faces: 4.0 mil (0.1 mm) thick white embossed aluminum facer one side, and a 1.25 mil (0.032 mm) thick plain embossed aluminum facer on the other side.
 8. Foam Surface Burning Characteristics (ASTM E84): flame spread \leq 25, smoke developed \leq 450.
 9. Water Vapor Transmission (ASTM E96): less than 0.03 perms.
 10. Water Absorption by Volume (ASTM C209): maximum 0.3 percent.
 11. Product and Manufacturer Name: THERMAX™ Heavy Duty Insulation Board by The Dow Chemical Company.

[OR]

SPEC NOTE: Do not specify THERMAX™ Heavy Duty Plus for ceiling applications.

- A. Rigid Foam Board Insulation: closed cell polyisocyanurate foam board with glass fiber reinforced core, to [ASTM C1289, Type I, Class 2] [and] [Fed. Spec. HH-I-1972/1, Class 2]; meeting the following criteria:
1. Thermal Resistance [(ASTM C1363 @ 75 deg. F)] [(ASTM C518 @ 75 deg. F)]: R-6.5 per 1 inch of thickness (RSI 1.14 per 25 mm of thickness).
 2. Density (ASTM D1622): nominal 2.0 pcf.
 3. Compressive Strength (ASTM D1621): minimum 25 psi.
 4. Board Sizes: 48 inches (1,220 mm) wide, [96 inches (2,440 mm)] [120 inches (3,050 mm)] [144 inches (3,660 mm)] long.
 5. Board Thickness: [½ inch (13 mm)] [1 inch (25 mm)] [2 inches (50 mm)] [3 inches (75 mm)] [as indicated on Drawings].
 6. Board Edges: [Square] [Shiplapped].
 7. Faces: 16.5 mil (0.42 mm) thick white embossed aluminum sheet bonded to a 1.0 mil (0.025 mm) thick aluminum foil facer one side, and a 1.0 mil (0.025 mm) thick plain aluminum facer on the other side.
 8. Foam Surface Burning Characteristics (ASTM E84): flame spread \leq 25, smoke developed \leq 450.
 9. Water Vapor Transmission (ASTM E96): less than 0.03 perms.
 10. Water Absorption by Volume (ASTM C209): maximum 0.3 percent.
 11. Product and Manufacturer Name: THERMAX™ Heavy Duty Plus Insulation Board by The Dow Chemical Company.
- B. Blanket Insulation: mineral fibre blankets, as specified in Section [07 21 16][_____].

2.03 ACCESSORIES

- A. Adhesive: single-component, polyurethane adhesives tested to:
 - a. Underwriters Laboratory Inc. - UL 1897 Standard for Safety for Uplift Tests for Roof Covering Systems
 - b. Factory Mutual Approvals for fire and wind uplift resistance for roof deck applications approved by Factory Mutual.
- B. Joint Closure Strips - Clip Strip Type: rigid PVC construction, J-channel shape, [1 inch (25 mm)] [1-1/2 inch (38 mm)] [2 inch (50 mm)] [2-1/2 inch (62 mm)] nominal size; Manufacturer: The Dow Chemical Company - PVC Clip Strip Joint Closures
- C. Joint Closure Strips - Interlocking Type: rigid PVC construction, two piece male-to-female connection, [1 inch (25 mm)] [1-1/2 inch (38 mm)] [2 inch (50 mm)] [2-1/2 inch (62 mm)] nominal size; female profile complete with pre-drilled holes spaced at 12 inches (300 mm) on center, both sides of attachment flange; Manufacturer: The Dow Chemical Company - PVC Clip Strip Joint Closures

SPEC NOTE: Specify joint tape for the exterior of board joints when the product is installed on the outside / above girts or purlins. Specify joint tape whenever joint closure strips are not being used. Specify white coated finish for use with white finished insulation boards.

- D. Joint Tape: 2.0 mil (0.051 mm) thick aluminum tape, 3 inches (75 mm) wide[, white coated finish]. Board joints must be clean prior to applying tapes.
- E. Mechanical Fasteners - Screw Type: ITW Buildex Multi-Diameter Insulation Tekes with Dow Quik-Caps or similar fastener with a 1-1/4 inch plastic washer.

SPEC NOTE: Specify impalement type fasteners for use in parking garages or to the underside of concrete slabs.

- F. Mechanical Fasteners - Impalement Type: eg. Stick-N-Pins by Durodyne Company.

SPEC NOTE: Consider specifying the joint sealant either in this Section, or as part of Section 07 92 00 - Joint Sealants, and edit the following paragraph accordingly. Strictly as a matter for information, some typical sealants that have been found to work successfully include: Vulkem 116, Sikaflex 201 and Dow Corning 790.

- G. Sealant: [One-part, flexible polyurethane-based elastomeric sealant; moisture curing and non-sagging; to ASTM C920, Type S, Grade NS, Class 25][as specified in Section [07 92 00][_____]].
- H. FROTH-PAK™ Foam Insulation kit (Class A) – for sealing roof to wall juncture [_____].

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect existing conditions to ensure they are suitable for work to begin. Do not proceed until unacceptable conditions are corrected.
- B. Ensure substrates are solid, clean, dry and free of any contaminants.
- C. Ensure Products are dry prior to installation. Replace damaged Products.

3.02 INSTALLATION

- A. Install rigid foam board insulation system in accordance with manufacturer's installation guidelines.
- B. Install boards with long axis perpendicular to supports. Ensure end joints are fully supported.
- C. Install insulation boards to ensure board width spans not less than 3 framing supports.
- D. Cut and fit boards to suit project requirements.

SPEC NOTE: Use the following paragraph when installing the rigid foam board system to purlins or girts. Contact Dow for special attachment methods for Factory Mutual Insured buildings.

- E. Secure boards to framing supports with mechanical screw-type fasteners, of sufficient length to penetrate framing support a minimum depth of [3/4 inch (19 mm)] [_____]. Space fasteners at maximum 12 inches (300 mm) on center.

SPEC NOTE: Use the following two paragraphs to specify the installation of the rigid foam insulation system using the clip strip joint closure method.

- F. Apply continuous 3/8 inch (10 mm) beads of joint sealant to both sides of joint closure strip and install joint closure strip over exposed edge of insulation boards. Do not fasten adjacent board to substrate until joint closure strip is installed.
- G. Install adjacent boards into the exposed joint closure strip's sealant bead and then secure to substrate.

SPEC NOTE: Use one of the following two paragraphs when installing the rigid foam board system to the underside of a parking garage deck or concrete slab. Dow does not recommend unsupported boards being attached in ceilings with just adhesive.

- H. Secure impalement-type fasteners to underside of deck, spaced at 12 inches (300 mm) on center. Impale insulation boards onto fasteners, ensuring tightly butted joints.
- [OR]
- H. Apply adhesive continuously to backside of insulation boards, and press boards to underside of deck. Conform to adhesive manufacturer's application and curing guidelines. Note: Minimal number of fasteners recommended to support the boards. (Contact Dow representative for more information)

SPEC NOTE: Minimal number of fasteners recommended to support. Contact Dow seller for more information.

SPEC NOTE: Use the following three paragraphs when installing the rigid foam insulation system with interlocking type joint closures over a solid concrete or masonry substrate.

- I. Mechanically fasten female portion of interlocking joint closure to [concrete] [masonry] substrate with pneumatic fasteners spaced at 12 inches (300 mm) on center. Align closure strip 1/8 inch (3 mm) from insulation board edge.
- J. Apply continuous 3/8 inch (10 mm) beads of adhesive to substrate between closure strips spaced at maximum 16 inches (400 mm) on center. Press boards firmly into place.
- K. Apply continuous 3/8 inch (10 mm) beads of joint sealant to both sides of insulation boards and insert male portion of closure strip into the female slots over beads of sealant. Ensure male closure strip secures board in place.

SPEC NOTE: Use the following three paragraphs when installing the rigid foam insulation system with shiplapped edges and/or butt edges with taped joints.

- L. Apply continuous 3/8 inch (10 mm) beads of joint sealant along shiplapped edge of insulation board and press next insulation board into sealant bead. Continue to mechanically fasten boards to framing members as specified above.
- M. Ensure insulation board surfaces are clean, free of dust and dry prior to applying joint tape.
- N. Apply joint tape over exposed board joints using a squeegee or bristle brush. Ensure tape adheres to embossed surface.

3.03 FIELD QUALITY CONTROL

- A. Jointly with [Architect] [Engineer] [Consultant] and manufacturer's representative, visually inspect the rigid foam insulation system application and confirm that the installation is in strict accordance with the manufacturer's recommendations.
- B. Ensure exposed or visible applications meet the manufacturer's standards for uniform appearance.
- C. Correct identified defects and irregularities.

3.09 CLEANING

- A. Refer to Section [01 74 00] [_____].
- B. Clean adjacent surfaces, levels and ground level areas of debris and excess Products.

3.10 PROTECTION

- A. Adequately protect Products and work from damage by weather, traffic and other causes.
- B. At the end of each Working Day, seal exposed edges to be weather tight.
- C. Protect adjacent Work from damage. Repair damage.

END OF SECTION