SECTION 072100 - THERMAL INSULATION

TIPS:

To view non-printing **Editor's Notes** that provide guidance for editing, click on MasterWorks/Single-File Formatting/Toggle/Editor's Notes.

To read **detailed research, technical information about products and materials, and coordination checklists**, click on MasterWorks/Supporting Information.

Access Product MasterSpec Sections:

<Double click here to view the list of manufacturer Sections available at ProductMasterSpec.com.>

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board insulation.
2. Molded (expanded) polystyrene foam-plastic board insulation.
3. Polyisocyanurate foam-plastic board insulation.
4. Glass-fiber blanket insulation.
5. Glass-fiber board insulation.

6. Mineral-wool blanket insulation.
7. Mineral-wool board insulation.
8. Loose-fill insulation.
9. Spray-applied cellulosic insulation.
10. Cellular glass insulation.
11. Reflective insulation.

B. Related Requirements:

1. Section 042000 "Unit Masonry" for insulation installed in masonry cells.
2. Section 061600 "Sheathing" for foam-plastic board sheathing installed directly over wood or steel framing.
3. [**Section 071326 "Self-Adhering Sheet Waterproofing"**] [**Section 071353 "Elastomeric Sheet Waterproofing"**] [**Section 071354 "Thermoplastic Sheet Waterproofing"**] [**Section 071413 "Hot Fluid-Applied Rubberized Asphalt Waterproofing"**] [**Section 071416 "Cold Fluid-Applied Waterproofing"**] for insulated drainage panels installed with plaza deck insulation.
4. Section 072119 "Foamed-in-Place Insulation" for spray-applied polyurethane foam insulation.
5. [**Section 075113 "Built-up Asphalt Roofing"**] [**Section 075116 "Built-up Coal Tar Roofing"**] [**Section 075213 "Atactic-Polypropylene (APP) Modified Bituminous Membrane Roofing"**] [**Section 075216 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Membrane Roofing"**] [**Section 075316 "Chlorosulfonate-Polyethylene (CSPE) Roofing"**] [**Section 075323 "Ethylene-Propylene-Diene-Monomer (EPDM) Roofing"**] [**Section 075416 "Ketone Ethylene Ester (KEE) Roofing"**] [**Section 075419 "Polyvinyl-Chloride (PVC) Roofing"**] [**Section 075423 "Thermoplastic-Polyolefin (TPO) Roofing"**] [**Section 075552.13 "Atactic-Polypropylene (APP) Modified Bituminous Protected Membrane Roofing"**] [**Section 075552.16 "Styrene-Butadiene-Styrene (SBS) Modified Bituminous Protected Membrane Roofing"**] [**Section 075556 "Fluid-Applied Protected Membrane Roofing"**] [**and**] [**Section 075700 "Coated Foamed Roofing"**] for insulation specified as part of roofing construction.
6. [**Section 092300 "Gypsum Plastering"**] [**Section 092400 "Portland Cement Plastering"**] [**Section 092613 "Gypsum Veneer Plastering"**] [**Section 092900 "Gypsum Board"**] for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Extruded polystyrene foam-plastic board insulation.
2. Molded (expanded) polystyrene foam-plastic board insulation.
3. Polyisocyanurate foam-plastic board insulation.
4. Glass-fiber blanket insulation.
5. Glass-fiber board insulation.
6. Mineral-wool blanket insulation.
7. Mineral-wool board insulation.
8. Loose-fill insulation.
9. Spray-applied cellulosic insulation.
10. Cellular glass insulation.

11. Reflective insulation.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Product Data: For adhesives, indicating VOC content.
3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
4. Laboratory Test Reports: For Insulation, indicating compliance with requirements for low-emitting materials.
5. Laboratory Test Reports: For insulation, indicating compliance with requirements for low-emitting materials.
6. Laboratory Test Reports: For insulation, indicating compliance with requirements for low-emitting materials.
7. Laboratory Test Reports: For insulation, indicating compliance with requirements for low-emitting materials.

1.4 INFORMATIONAL SUBMITTALS

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

1. For blown-in or sprayed fiberglass and cellulosic-fiber loose-fill insulation, indicate initial installed thickness, settled thickness, settled R-value, installed density, coverage area, and number of bags installed.
2. Sign, date, and post the certification in a conspicuous location on Project site.

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

C. Research Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

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

B. Protect foam-plastic board insulation as follows:

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

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Extruded Polystyrene Board Insulation, Type X **<Insert drawing designation>**: ASTM C578, Type X, 15-psi (104-kPa) minimum compressive strength; unfaced.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. MBCI.
d. Owens Corning.
e. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.

B. Extruded Polystyrene Board Insulation, Type IV **<Insert drawing designation>**: ASTM C578, Type IV, 25-psi (173-kPa) minimum compressive strength; unfaced.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Kingspan Insulation Limited.
d. Owens Corning.
e. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

C. Extruded Polystyrene Board Insulation, Type IV, Drainage Panels **<Insert drawing designation>**: ASTM C578, Type IV, 25-psi (173-kPa) minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

D. Extruded Polystyrene Board Insulation, Type VI **<Insert drawing designation>**: ASTM C578, Type VI, 40-psi (276-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Kingspan Insulation Limited.
d. Owens Corning.
e. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

E. Extruded Polystyrene Board Insulation, Type VI, Drainage Panels **<Insert drawing designation>**: ASTM C578, Type VI, 40-psi (276-kPa) minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Kingspan Insulation Limited.
d. Owens Corning.
e. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

F. Extruded Polystyrene Board Insulation, Type VII **<Insert drawing designation>**: ASTM C578, Type VII, 60-psi (414-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Kingspan Insulation Limited.
d. Owens Corning.
e. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

G. Extruded Polystyrene Board Insulation, Type VII, Drainage Panels **<Insert drawing designation>**: ASTM C578, Type VII, 60-psi (414-kPa) minimum compressive strength; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

H. Extruded Polystyrene Board Insulation, Type V **<Insert drawing designation>**: ASTM C578, Type V, 100-psi (690-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Dow Chemical Company (The).
b. Owens Corning.
c. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 450 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

2.2 MOLDED (EXPANDED) POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

A. Molded (Expanded) Polystyrene Board Insulation, Type I **<Insert drawing designation>**: ASTM C578, Type I, 10-psi (69-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACH Foam Technologies, Inc.
b. Atlas EPS; a Division of Atlas Roofing Corporation.
c. DiversiFoam Products.
d. Insulfoam; Carlisle Construction Materials Company.
e. Plymouth Foam, Inc.
f. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

B. Molded (Expanded) Polystyrene Board Insulation, Type VIII **<Insert drawing designation>**: ASTM C578, Type VIII, 13-psi ((90-kPa)) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACH Foam Technologies, Inc.
b. Atlas EPS; a Division of Atlas Roofing Corporation.
c. DiversiFoam Products.
d. Plymouth Foam, Inc.
e. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

C. Molded (Expanded) Polystyrene Board Insulation, Type II **<Insert drawing designation>**: ASTM C578, Type II, 15-psi (104-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACH Foam Technologies, Inc.
b. Atlas EPS; a Division of Atlas Roofing Corporation.
c. DiversiFoam Products.
d. Insulfoam; Carlisle Construction Materials Company.
e. Plymouth Foam, Inc.
f. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

D. Molded (Expanded) Polystyrene Board Insulation, Type IX **<Insert drawing designation>**: ASTM C578, Type IX, 25-psi (173-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACH Foam Technologies, Inc.
b. Atlas EPS; a Division of Atlas Roofing Corporation.
c. DiversiFoam Products.
d. Insulfoam; Carlisle Construction Materials Company.
e. Plymouth Foam, Inc.
f. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

E. Molded (Expanded) Polystyrene Board Insulation, Type XIV <**Insert drawing designation**>: ASTM C578, Type XIV, 40-psi (276-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACH Foam Technologies, Inc.
b. Atlas EPS; a Division of Atlas Roofing Corporation.
c. Insulfoam; Carlisle Construction Materials Company.
d. Plymouth Foam, Inc.
e. <**Insert manufacturer's name**>.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

F. Molded (Expanded) Polystyrene Board Insulation, Type XV <**Insert drawing designation**>: ASTM C578, Type XV, 60-psi (414-kPa) minimum compressive strength.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACH Foam Technologies, Inc.
b. Atlas EPS; a Division of Atlas Roofing Corporation.
c. Insulfoam; Carlisle Construction Materials Company.
d. Plymouth Foam, Inc.
e. <**Insert manufacturer's name**>.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

2.3 POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

A. Polyisocyanurate Board Insulation, Foil Faced <**Insert drawing designation**>: ASTM C1289, foil faced, Type I, Class 1 or 2.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Atlas EPS; a Division of Atlas Roofing Corporation.
b. Atlas Roofing Corporation.
c. Carlisle Coatings & Waterproofing Inc.
d. Dow Chemical Company (The).
e. Firestone Building Products.
f. Hunter Panels.
g. Johns Manville; a Berkshire Hathaway company.
h. Rmax, Inc.
i. <**Insert manufacturer's name**>.

2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

3. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

B. Polyisocyanurate Board Insulation, Glass-Fiber-Mat Faced **<Insert drawing designation>**: ASTM C1289, glass-fiber-mat faced, Type II, Class 2.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Atlas Roofing Corporation.
b. Carlisle Coatings & Waterproofing Inc.
c. Firestone Building Products.
d. Hunter Panels.
e. Rmax, Inc.
f. **<Insert manufacturer's name>**.

2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
3. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

2.4 GLASS-FIBER BLANKET INSULATION

A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less, except for insulation manufactured without formaldehyde.

D. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **<Insert value>** percent.

F. Glass-Fiber Blanket Insulation, Unfaced **<Insert drawing designation>**: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.

1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Corporation; [**Sustainable Insulation**] [**CertaPRO® Sustainable Insulation**] [**CertaPRO® AcoustaBlanket Black, Universal Blanket**] or comparable product by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.
c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

G. Glass-Fiber Blanket Insulation, Polypropylene-Scrim-Kraft Faced **<Insert drawing designation>**: ASTM C665, Type II (nonreflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier).

1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Corporation; [**Sustainable Insulation**] [**CertaPRO® Sustainable Insulation**] or comparable product by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.
c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

H. Glass-Fiber Blanket Insulation, Kraft Faced **<Insert drawing designation>**: ASTM C665, Type II (nonreflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).

1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Corporation; [**Sustainable Insulation**] [**CertaPRO® Sustainable Insulation**] or comparable product by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.
c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

I. Glass-Fiber Blanket Insulation, Reinforced-Foil Faced **<Insert drawing designation>**: ASTM C665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Corporation; [**Sustainable Insulation**] [**CertaPRO® Sustainable Insulation**] or comparable product by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.

c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

J. Glass-Fiber Blanket Insulation, Foil Faced **<Insert drawing designation>**: ASTM C665, Type III (reflective faced), Class B (faced surface with a flame-propagation resistance of 0.12 W/sq. cm); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Corporation; [**Sustainable Insulation**] [**CertaPRO® Sustainable Insulation**] or comparable product by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.
c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

2.5 GLASS-FIBER BOARD INSULATION

A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less, except for insulation manufactured without formaldehyde.

D. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **<Insert value>** percent.

F. Glass-Fiber Board Insulation, Unfaced **<Insert drawing designation>**: ASTM C612, Type IA; unfaced[**, passing ASTM E136 for combustion characteristics**].

1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Corporation; CertaPRO® Commercial Board or comparable product by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.
c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
4. Nominal Density: [**2.25 lb/cu. ft (36 kg/cu. m)**] [**3 lb/cu. ft. (48 kg/cu. m)**] [**4.25 lb/cu. ft. (68 kg/cu. m)**] [**6 lb/cu. ft. (96 kg/cu. m)**].
5. Thermal Resistivity: 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
6. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

G. Glass-Fiber Board Insulation, Faced **<Insert drawing designation>**: ASTM C612, Type IA; faced on one side with foil-scrim-kraft or foil-scrim-polyethylene vapor retarder.

1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Corporation; CertaPRO® Commercial Board or comparable product by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.
c. Owens Corning.
d. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
4. Nominal Density: [**2.25 lb/cu. ft. (36 kg/cu. m)**] [**3 lb/cu. ft. (48 kg/cu. m)**] [**4.25 lb/cu. ft. (68 kg/cu. m)**] [**6 lb/cu. ft. (96 kg/cu. m)**].
5. Thermal Resistivity: 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C).
6. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

2.6 MINERAL-WOOL BLANKET INSULATION

A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less, except for insulation manufactured without formaldehyde.

D. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **<Insert value>** percent.

F. Mineral-Wool Blanket Insulation, Unfaced **<Insert drawing designation>**: ASTM C665, Type IA (blankets without membrane facing); consisting of fibers; passing ASTM E136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Johns Manville; a Berkshire Hathaway company.
   b. Rockwool International.
   c. Thermafiber, Inc.; an Owens Corning company.
   d. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

G. Mineral-Wool Blanket Insulation, Reinforced-Foil Faced **<Insert drawing designation>**: ASTM C665, Type III (reflective faced); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

   a. Thermafiber, Inc.; an Owens Corning company.
   b. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

2.7 MINERAL-WOOL BOARD INSULATION

A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less, except for insulation manufactured without formaldehyde.

D. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **<Insert value>** percent.

F. Mineral-Wool Board Insulation, Types IA and IB, Unfaced **<Insert drawing designation>**: ASTM C612, Types IA and IB; passing ASTM E136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Johns Manville; a Berkshire Hathaway company.
    b. Rockwool International.
    c. Thermafiber, Inc.; an Owens Corning company.
    d. **<Insert manufacturer's name>**.

2. Nominal Density: 4 lb/cu. ft. (64 kg/cu. m).
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

G. Mineral-Wool Board Insulation, Types IA and IB, Faced **<Insert drawing designation>**: ASTM C612, Types IA and IB; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Johns Manville; a Berkshire Hathaway company.
    b. Thermafiber, Inc.; an Owens Corning company.
    c. **<Insert manufacturer's name>**.

2. Nominal Density: 4 lb/cu. ft. (64 kg/cu. m).
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

H. Mineral-Wool Board Insulation, Type II, Unfaced **<Insert drawing designation>**: ASTM C612, Type II; passing ASTM E136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Johns Manville; a Berkshire Hathaway company.
    b. Rockwool International.
    c. Thermafiber, Inc.; an Owens Corning company.
    d. **<Insert manufacturer's name>**.

2. Nominal Density: 6lb/cu. ft. ((96 kg/cu. m)).
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

I. Mineral-Wool Board Insulation, Type II, Faced **<Insert drawing designation>**: ASTM C612, Type II; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Johns Manville; a Berkshire Hathaway company.
    b. SPI, LLC dba, SPI – Specialty Products & Insulation.
    c. Thermafiber, Inc.; an Owens Corning company.
    d. **<Insert manufacturer's name>**.

2. Nominal Density: 6lb/cu. ft. (96 kg/cu. m).
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

J. Mineral-Wool Board Insulation, Type III, Unfaced **<Insert drawing designation>**: ASTM C612, Type III; passing ASTM E136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Johns Manville; a Berkshire Hathaway company.
    b. Rockwool International.
    c. Thermafiber, Inc.; an Owens Corning company.
    d. **<Insert manufacturer's name>**.

2. Nominal Density: 8lb/cu. ft. (128 kg/cu. m).
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

K. Mineral-Wool Board Insulation, Type III, Faced **<Insert drawing designation>**: ASTM C612, Type III; faced on one side with foil-scrim or foil-scrim-polyethylene vapor retarder.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Rockwool International.
c. SPI, LLC dba, SPI – Specialty Products & Insulation.
d. Thermafiber, Inc.; an Owens Corning company.
e. **<Insert manufacturer's name>**.

2. Nominal Density: 8 lb/cu. ft. (128 kg/cu. m).
3. Flame-Spread Index: Not more than 15 when tested in accordance with ASTM E84.
4. Smoke-Developed Index: Not more than zero when tested in accordance with ASTM E84.
5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

2.8 LOOSE-FILL INSULATION

A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less, except for insulation manufactured without formaldehyde.

D. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **<Insert value>** percent.

F. Cellulosic-Fiber Loose-Fill Insulation **<Insert drawing designation>**: ASTM C739, chemically treated for flame-resistance, processing, and handling characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. GreenFiber.
b. Hamilton Manufacturing Inc.

c. Nu-Wool Co., Inc.
d. **<Insert manufacturer's name>**.

G. Glass-Fiber Loose-Fill Insulation **<Insert drawing designation>**: ASTM C764, [**Type I for pneumatic application**] [**or**] [**Type II for poured application**].

1. Basis-of-Design Product: Subject to compliance with requirements, provide CertainTeed Corporation; [**InsulSafe® SP Premium Loosefill Insulation**] [**OPTIMA® Blown-in Insulation**] or comparable product by one of the following:

a. Johns Manville; a Berkshire Hathaway company.
b. Knauf Insulation.
c. **<Insert manufacturer's name>**.

2. Flame-Spread Index: Not more than 5 when tested in accordance with ASTM E84.
3. Smoke-Developed Index: Not more than 5 when tested in accordance with ASTM E84.

2.9 SPRAY-APPLIED CELLULOSIC INSULATION

A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less, except for insulation manufactured without formaldehyde.

D. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **<Insert value>** percent.

F. Self-Supported, Spray-Applied Cellulosic Insulation **<Insert drawing designation>**: ASTM C1149, [**Type I (materials applied with liquid adhesive; suitable for either exposed or enclosed applications),**] [**Type II (materials containing a dry adhesive activated by water during installation; intended only for enclosed or covered applications),**] [**Type III (materials containing an adhesive mixed with water during application; intended for application on attic floors),**] chemically treated for flame-resistance, processing, and handling characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. GreenFiber.
b. Hamilton Manufacturing Inc.
c. International Cellulose Corp.
d. **<Insert manufacturer's name>**.

2.10 CELLULAR GLASS INSULATION

A. Cellular Glass Insulation **<Insert drawing designation>**: ASTM C552, [**Type I (flat block)**] [**Type IV (board)**] [**faced on both sides with manufacturer's special kraft-paper sheets laminated to glass block with asphalt**].

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Pittsburgh Corning Corporation.
b. **<Insert manufacturer's name>**.

2. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches ((305 mm)) and wider in width.

2.11 REFLECTIVE INSULATION

A. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less, except for insulation manufactured without formaldehyde.

D. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Reflective Insulation: ASTM C1224, with one or more low-emittance surfaces with emittance value of 0.1 or less as measured per ASTM C1371.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Covertech Fabricating Inc.
b. Fi-Foil Company, Inc.
c. Innovative Energy, Inc.
d. Innovative Insulation, Inc.
e. ISI Building Products.

f. Reflectix Inc.
g. TVM Building Products.
h. **<Insert manufacturer's name>**.

2. Construction: [**Surfaces separated with internal expanders**] [**Surfaces separated by single-layer polyethylene bubble film**] [**Surfaces separated by double-layer polyethylene bubble film**] **<Insert construction>**.
3. Surface-Burning Characteristics: Maximum flame spread and smoke developed indexes of [**25 and 50**] [**25 and 450**] **<Insert values>**, respectively when tested in accordance with ASTM E84.
4. Water-Vapor Transmission: [**1 perm, maximum**] [**5 perms or greater**].

F. Sheet Radiant Barrier: ASTM C1313/C1313M with at least one surface with emittance value of 0.1 or less as measured per ASTM C1371.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Covertech Fabricating Inc.
b. Fi-Foil Company, Inc.
c. Innovative Energy, Inc.
d. Innovative Insulation, Inc.
e. ISI Building Products.
f. Reflectix Inc.
g. TVM Building Products.
h. **<Insert manufacturer's name>**.

2. Construction: [**Foil on one side of substrate**] [**Foil on both sides of substrate**] [**Vacuum metallizing on substrate**].
3. Surface-Burning Characteristics: Maximum flame spread and smoke developed indexes of [**5 and 10**] **<Insert values>**, respectively when tested in accordance with ASTM E84.
4. Tear Resistance: **<Insert value>**.
5. Water-Vapor Transmission: [**1 perm, maximum**] [**5 perms or greater**].
6. Sheet Width: **<Insert width>**.

G. Interior Radiation Control Coating System: Silver-colored, low-emissivity, [**solvent**] [**water**]-based coating; with a surface emittance value of 0.25 or less as measured per ASTM C1371.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. SOLEC Corporation.
b. STS Coatings, Inc.
c. **<Insert manufacturer's name>**.

2.12 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AGM Industries, Inc.
    b. Gemco.
    c. **<Insert manufacturer's name>**.
2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation.

B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Gemco.
    b. **<Insert manufacturer's name>**.
2. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation.

C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AGM Industries, Inc.
    b. Gemco.
    c. **<Insert manufacturer's name>**.
2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:

    a. Crawl spaces.
    b. Ceiling plenums.
    c. Attic spaces.
    d. **<Insert location>**.

D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of [**1 inch (25 mm)**] [**2 inches (50 mm)**] [**3 inches (76 mm)**] between face of insulation and substrate to which anchor is attached.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

    a. Gemco.

b. **<Insert manufacturer's name>**.

E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AGM Industries, Inc.
b. Gemco.
c. **<Insert manufacturer's name>**.

2.13 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

1. Adhesives shall have a VOC content of [**70**] **<Insert value>** g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
4. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 9 mcg/cu. m or 7 ppb, whichever is less.
5. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
6. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." The building concentration of formaldehyde shall not exceed half of the indoor recommended exposure limit, or 33 mcg/cu. m, and that of acetaldehyde shall not exceed 9 mcg/cu. m.

C. Asphalt Coating for Cellular-Glass Block Insulation: Cutback asphalt or asphalt emulsion of type recommended by manufacturer of cellular-glass block insulation.

D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Install insulation with manufacturer's R-value label exposed after insulation is installed.

D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive in accordance with manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of [**24 inches (610 mm)**] [**36 inches (915 mm)**] <**Insert dimension**> below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units in accordance with manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of [**24 inches (610 mm)**] [**36 inches (915 mm)**] <**Insert dimension**> in from exterior walls.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

A. Butt panels together for tight fit.

B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:

1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive in accordance with anchor manufacturer's written instructions.
2. Space anchors in accordance with insulation manufacturer's written instructions for insulation type, thickness, and application.
3. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.
4. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
5. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing in accordance with manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face and as recommended by manufacturer.

1. Fit courses of insulation between[**wall ties and other**] obstructions, with edges butted tightly in both directions, and with faces flush.
2. Press units firmly against inside substrates.
3. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

B. Cellular-Glass Board Insulation: Install with closely fitting joints using [**adhesive pad**] [**serrated trowel**] attachment method in accordance with manufacturer's written instructions.

C. Mineral-Wool Board Insulation: Install insulation fasteners 4 inches (100 mm) from each corner of board insulation, at center of board, and as recommended by manufacturer.

1. Fit courses of insulation between[**masonry wall ties and other**] obstructions, with edges butted tightly in both directions, and with faces flush.
2. Press units firmly against inside substrates.

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members in accordance with the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
6. For wood-framed construction, install blankets in accordance with ASTM C1320 and as follows:

    a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

7. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

    a. Exterior Walls: Set units with facing placed toward [**exterior of construction**] [**interior of construction**] [**as indicated on Drawings**].
    b. Interior Walls: Set units with facing placed [**as indicated on Drawings**] [**toward areas of high humidity**] <**Insert location**>.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply in accordance with manufacturer's written instructions.

C. Loose-Fill Insulation: Apply in accordance with ASTM C1015 and manufacturer's written instructions.

1. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
2. For cellulosic-fiber loose-fill insulation, comply with CIMA's Bulletin #2, "Standard Practice for Installing Cellulose Insulation."

D. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation in accordance with manufacturer's written instructions.

1. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked.
2. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.7 INSTALLATION OF CURTAIN-WALL INSULATION

A. Install board insulation in curtain-wall construction in accordance with curtain-wall manufacturer's written instructions.

1. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass.
2. Maintain cavity width of dimension indicated on Drawings between insulation and glass.
3. Install insulation to fit snugly without bowing.

3.8 INSTALLATION OF REFLECTIVE INSULATION

A. Install sheet reflective insulation in accordance with ASTM C727.

B. Install sheet radiant barriers in accordance with ASTM C1744.

C. Install interior radiation control coating system in accordance with ASTM C1321.

3.9 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100