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This MANU-SPEC® utilizes the Construction Specifications Institute (CSI) *Manual of Practice*, including *MasterFormat*™, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets [ ]; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies formaldehyde-free building insulation. These products are manufactured by Johns Manville. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Formaldehyde-free fiberglass thermal [And] [Sound control] insulation.

Specifier Note: Revise paragraph below to suit project requirements. If a reader of this section could reasonably expect to find a product or component specified in this section, but it is actually specified elsewhere, then the related section number(s) should be listed in the paragraph below. Add section numbers and titles per CSI *MasterFormat* and specifier's practice. In the absence of related sections, delete paragraph below.

B. Related Sections:

1. Division 07 Section: Roof Deck Insulation.
2. Division 07 Section: Joint Sealants.
3. Division 08 Section: Curtain Wall.
4. Division 09 Section: Gypsum Board.
5. Division 09 Section: Acoustical Ceilings.
6. Division 23 Section: Mechanical: [Duct insulation] [Equipment insulation] [And] [Pipe insulation].

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain References Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 01 References Section may establish the edition date of standards. This article does not require compliance with standard. It is a listing of all references used in this section.

1.02 REFERENCES

A. ASTM International:

1. ASTM C165 Standard Test Method for Measuring Compressive Properties of Thermal Insulations.
2. ASTM C356 Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat.

3. ASTM C411 Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
4. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
5. ASTM C612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
6. ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
7. ASTM C764 Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation.
8. ASTM C1015 Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation.
9. ASTM C1104 Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
10. ASTM C1304 Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials.
11. ASTM C1320 Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
12. ASTM C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
13. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
14. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
15. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
16. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
17. ASTM E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.
18. ASTM E970 Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source.

B. California Integrated Waste Management Board (CIWMB):
   1. Section 01350 Special Environmental Requirements Specification.

C. Leadership in Energy and Environmental Design (LEED):
   1. Materials and Resources (MR) Credit 4.1 - Recycled Content 5%.
   2. Materials and Resources (MR) Credit 4.2 - Recycled Content 10%.

Specifier Note: Article below should be restricted to statements describing design or performance requirements and functional (not dimensional) tolerances of a complete system. Limit descriptions to composite and operational properties required to link components of a system together and to interface with other systems. Because insulation applications may have multiple performance criteria, coordinate language used here with other sections.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Provide [Products/systems] that have been manufactured, fabricated and installed to the following criteria:
   1. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test methods indicated below or other testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
      a. Surface Burning Characteristics (ASTM E84): [Specify assembly rating and design number.].
      b. Assembly Fire Resistance Rating (ASTM E119): [Specify assembly rating and design number.].
      c. Combustion Characteristics (ASTM E136): [Specify assembly rating and design number.].
   2. Assembly Sound Transmission Rating (ASTM E90): [Specify assembly rating and design number.].
   3. Sound Absorption (ASTM C423): [Specify noise reduction coefficient.].
   4. [Specify any additional design requirements (fire, sound, thermal).].

B. Performance Requirements: Provide [Products/systems] that have been manufactured, fabricated and installed to the

following criteria:

1. Surface Burning Characteristics, Unfaced (ASTM E84): Flamespread index 25, smoke developed 50.
2. Recycled Glass Content: 25%.
3. Combustibility (ASTM E136): Noncombustible.
4. Formaldehyde Content: Free of formaldehyde.
5. [Specify any additional performance requirements (fire, sound, thermal).].

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 01 Submittal Procedures Section.

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with provisions of Section 01300 Administrative Requirements.

B. Product Data: Submit manufacturer's product data and installation instructions, including manufacturer's SPEC-DATA® sheets.

C. Samples: Submit manufacturer's standard selection and verification samples.

D. Quality Assurance/Control Submittals: Submit the following:

1. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

   [Fire] [Sound] [And] [Thermal] at recognized test laboratories.

E. LEED Submittals: Provide documentation indicating how the requirements of Credit MR 4.1 [And 4.2] will be met.

1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
3. Documentation that the product passes CIWMB Section 01350 for indoor air quality.

Specifier Note: Article below should include statements of prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 01 Quality Assurance Section.

1.05 QUALITY ASSURANCE

A. Obtain each type of building insulation through a single source.

B. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 01 Regulatory Requirements Section. Repetitive statements should be avoided.

C. Regulatory Requirements and Approvals: [Specify applicable requirements of regulatory agencies.].

1. [Code agency name].

   a. [Report or approval number].

Specifier Note: Retain paragraph below if mock-up is required.

D. Mock-Ups: [Specify requirements for mock-up.].

1. Subject to acceptance by owner, mock-up may be retained as part of finish work.
2. If mock-up is not retained, remove and properly dispose of mock-up.

Specifier Note: Retain paragraph below if preinstallation meeting is required.

E. Preinstallation Meetings: [Specify requirements for meeting.].

Specifier Note: Article below should include specific protection and environmental conditions required during storage. Coordinate article below with Division 01 Product Requirements Section.

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 01 Product Requirement Section.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 FORMALDEHYDE-FREE BUILDING INSULATION

A. Manufacturer: Johns Manville.

1. Contact: 717 17th Street 80202; PO Box 5108, Denver, CO 80217-5108; Telephone: (800) 654-3103; Fax: (303) 978-2318; E-mail: pics@jm.com; website: www.specJM.com.

B. Proprietary Products/Systems: Building insulation, including the following:

Specifier Note: Retain the following paragraph and associated subparagraphs for installation within wall cavities, floors and ceilings. Product is also available for metal or wood framing and may be used with a separate vapor retarder when moisture control is required. High-performance cathedral ceiling batts are also available.

1. JM Formaldehyde-free Unfaced Batts:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from R-11 through R-38.

a. Thermal Resistance (R-Value): [Specify R-value.].

b. Combustion Characteristics (ASTM E136): Pass.

c. Critical Radiant Flux (ASTM E970): Greater than 0.11 Btu/ft^2 × s (0.12 W/cm^2).

d. Water Vapor Sorption (ASTM C1104): 5% or less.

e. Odor Emission (ASTM C1304): Pass.

f. Corrosiveness (ASTM C665): Pass.

g. Fungi Resistance (ASTM C1338): Pass.

h. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

i. Prove through documentation that product complies with CIWMB Section 01350 for indoor air quality.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

j. Thickness: [Specify thickness.].

k. Flamespread (ASTM E84): 25, maximum.

l. Smoke Developed (ASTM E84): 50, maximum.

m. Material Standard: ASTM C665, Type I.

Specifier Note: Retain the following paragraph and associated subparagraphs for metal framing. Kraft faced insulation is also available for wood-framed construction. Kraft and foil faced batts should be used in concealed applications. Foil facings provide excellent vapor retarders.

2. JM Formaldehyde-free Kraft and Foil-faced Batts:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from R-11 through R-38.

a. Thermal Resistance (R-Value): [Specify R-value.].

Specifier Note: The 2 following subparagraphs apply only to foil faced batt insulation. Delete if retaining only foil faced insulation.

b. Combustion Characteristics (ASTM E136): Pass.
c. Critical Radiant Flux (ASTM E970): Greater than 0.11 Btu/ft^2 × s (0.12 W/cm^2).
d. Water Vapor Permeance (ASTM E96): [0.05 perm (2.9 ng/Pa × s × m^2) for foil faced] [1.0 perm (57.5 ng/Pa × s × m^2) for Kraft faced].
e. Water Vapor Sorption (ASTM C1104): 5% or less by weight.
f. Odor Emission (ASTM C1304): Pass.
g. Corrosiveness (ASTM C665, 13.8): Pass.
h. Fungi Resistance (ASTM C1338): Pass.
i. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.
j. Prove through documentation that product complies with CIWMB Section 01350 for indoor air quality.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

k. Thickness: [Specify thickness.].
l. Flamespread (ASTM E84):
    1) Foil-faced Batts: 75, maximum.
    2) Kraft-faced Batts: Unrated.
m. Smoke Developed (ASTM E84):
    1) Foil-faced Batts: 450, maximum.
    2) Kraft-faced Batts: Unrated.
n. Material Standard:
    1) Foil-faced Batts: ASTM C665, Type III, Class B, Category 1.
    2) Kraft-faced Batts: ASTM C665, Type II, Class C, Category 1.

Specifier Note: Retain the following paragraph and associated subparagraphs for metal or wood framing. FSK-25 facings provide excellent vapor retarders. FSK-25 faced batts are for exposed applications.

3. JM Formaldehyde-free FSK-25 Faced Batts:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from R-11, R-13, R-19, R-30.

a. Thermal Resistance (R-Value): [R-11] [R-13] [R-19] [R-30].
b. Combustion Characteristics (ASTM E136): Pass.
c. Critical Radiant Flux (ASTM E970): Greater than 0.11 Btu/ft^2 × s (0.12 W/cm^2).
d. Water Vapor Permeance (ASTM E96): 0.05 perm (2.9 ng/Pa × s × m^2).
e. Water Vapor Sorption (ASTM C1104): 5% or less.
f. Odor Emission (ASTM C1304): Pass.
g. Corrosiveness (ASTM C665, 13.8): Pass.
h. Fungi Resistance (ASTM C1338): Pass.

i. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

j. Prove through documentation that product passes CIWMB Section 01350 for indoor air quality.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

k. Thickness: [Specify thickness.].

l. Flamespread (ASTM E84): 25, maximum.

m. Smoke Developed (ASTM E84): 50, maximum.

n. Material Standard: ASTM C665, Type III, Class A, Category 1.

Specifier Note: Retain the following paragraph and associated subparagraphs for various concealed exterior and interior metal or wood framed cavities and directly above suspended ceilings. For wall applications, the vapor retarder is placed on the flange side while the remaining sides are perforated for moisture flow. For underfloor applications, the vapor retarder is placed on the side opposite the stapling flange side for proper contact with the subfloor.

4. JM Formaldehyde-free ComfortTherm Poly-Encapsulated Batts:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from R-11 through R-38.

a. Thermal Resistance (R-Value): [Specify R-value.].

b. Combustion Characteristics (ASTM E136): Pass.

c. Critical Radiant Flux (ASTM E970): Greater than 0.11 Btu/ft^2 × s (0.12 W/cm^2).

d. Water Vapor Sorption (ASTM C1104): 5% or less by weight.

e. Odor Emission (ASTM C1304): Pass.

f. Corrosiveness (ASTM C665, 13.8): Pass.

g. Fungi Resistance (ASTM C1338): Pass.

h. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

i. Prove through documentation that product passes CIWMB Section 01350 for indoor air quality.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

j. Thickness: [Specify thickness.].

k. Flamespread (ASTM E84): 25, maximum.

l. Smoke Developed (ASTM E84): 50, maximum.

m. Material Standard: ASTM C665, Type II, Class A (membrane-faced surface with a flamespread of 25 or less), Category 1 (membrane is a vapor barrier).

Specifier Note: Retain the following paragraph and associated subparagraphs for panel deck roof applications where improved thermal performance and light reflectivity are important.

5. JM Formaldehyde-free FSK-25 and PSK-faced Panel Deck Batts:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from R-19 or R-30.

a. Thermal Resistance (R-Value): [R-19] [R-30].

b. Combustion Characteristics (ASTM E136): Pass.

c. Critical Radiant Flux (ASTM E970): Greater than 0.11 Btu/ft^2 × s (0.12 W/cm^2).

d. Water Vapor Permeance (ASTM E96): 0.05 perm (2.9 ng/Pa × s × m^2).

e. Water Vapor Sorption (ASTM C1104): 5% or less.

f. Odor Emission (ASTM C1304): Pass.

g. Corrosiveness (ASTM C665, 13.8): Pass.

h. Fungi Resistance (ASTM C1338): Pass.

i. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

j. Prove through documentation that product passes CIWMB Section 01350 for indoor air quality.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

k. Thickness: [Specify thickness.].

l. Flamespread (ASTM E84): 25, maximum.

m. Smoke Developed (ASTM E84): 50, maximum.

n. Material Standard:

1) FSK-25 Faced Panel Deck Batts: ASTM C665, Type III, Class A, Category 1.

2) PSK-faced Panel Deck Batts: ASTM C665, Type II, Class A, Category 1.

Specifier Note: Retain the following paragraph and associated subparagraphs for curtain wall and other general commercial construction applications. Product below is generally used where framing members are not present.

6. JM Unfaced Insul-SHIELD Board:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from available R-values: (IA 100, 150, 225, 300, 600) (IA & IB 300, 600).

a. Thermal Resistance (R-Value): [Specify R-value.].

b. Combustion Characteristics (ASTM E136): Pass.

c. Maximum Use Temperature (ASTM C411): 350 degrees F (177 degrees C).

d. Water Vapor Permeance (Faced Only) (ASTM E96) 0.05 perm (2.9 ng/Pa × s × m^2).

e. Water Vapor Sorption (IS 300 and 600 Only) (ASTM C1104): 5% or less by weight.

f. Compressive Resistance (IS 300 and 600 Only) (ASTM C165): 25 psf (1.2 kPa) at 10%.

g. Linear Shrinkage (ASTM C356): None.

h. Odor Emission (ASTM C1304): Pass.

i. Corrosiveness (ASTM C665, 13.8): Pass.

j. Fungi Resistance (ASTM C1338): Pass.

Specifier Note: Indicate appropriate recycled content based upon manufacturer's product literature.

k. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

m. Thickness: [Specify thickness.].

n. Flamespread (ASTM E84): 25, maximum.

o. Smoke Developed (ASTM E84): 50, maximum.

p. Material Standard: ASTM C612, Type IA or IB.

Specifier Note: Retain the following paragraph and associated subparagraphs for curtain wall and other general commercial construction applications. Products below are generally used where framing members are not present.

7. JM FSK-25 and PSK-faced Insul-SHIELD Board:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from available R-values: (IA 100, 150, 225, 300, 600) (IA & IB 300, 600).

a. Thermal Resistance (R-Value): [Specify R-value.].
b. Combustion Characteristics (ASTM E136): Pass.
c. Maximum Use Temperature (ASTM C411): 250 degrees F (121 degrees C).
d. Water Vapor Permeance (ASTM E96): 0.05 perm (2.9 ng/Pa × s × m^2).
e. Water Vapor Sorption (ASTM C1104): 5% or less by weight.
f. Compressive Resistance (ASTM C165): 25 psf (1.2 kPa) at 10%.
g. Linear Shrinkage (ASTM C356): None.
h. Odor Emission (ASTM C1304): Pass.
i. Corrosiveness (ASTM C665, 13.8): Pass.
j. Fungi Resistance (ASTM C1338): Pass.

Specifier Note: Indicate appropriate recycled content based upon manufacturer's product literature.

k. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

m. Thickness: [Specify thickness.].
n. Flamespread (ASTM E84): 25, maximum.
o. Smoke Developed (ASTM E84): 50, maximum.
p. Material Standard: ASTM C612, Type IA or IB.

Specifier Note: Retain the following paragraph and associated subparagraphs when acoustical performance is crucial. The following product can also be used behind curtains or other wall coverings. Product is generally used where framing members are not present.

8. JM Black Faced Insul-SHIELD Board:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from available R-values.

a. Thermal Resistance (R-Value): [Specify R-value.].
b. Combustion Characteristics (ASTM E136): Pass.
c. Maximum Use Temperature (ASTM C411): 250 degrees F (121 degrees C) for faced.
d. Water Vapor Sorption (ASTM C1104): 5% or less by weight.
e. Compressive Resistance (ASTM C165): 25 psf (1.2 kPa) at 10%.
f. Linear Shrinkage (ASTM C356): None.
g. Odor Emission (ASTM C1304): Pass.
h. Corrosiveness (ASTM C665, 13.8): Pass.

i. Fungi Resistance (ASTM C1338): Pass.

Specifier Note: Indicate appropriate recycled content based upon manufacturer's product literature.

j. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

l. Thickness: [Specify thickness.].

m. Flamespread (ASTM E84): 25, maximum.

n. Smoke Developed (ASTM E84): 50, maximum.

o. Material Standard: ASTM C612.

Specifier Note: Retain the following paragraph and associated subparagraphs for use in attics and hard-to-reach locations like corners, nooks and crannies.

9. JM Formaldehyde-free Climate Pro Loose Fill Insulation:

Specifier Note: Indicate appropriate R-value in the following subparagraph; select from available R-values.

a. Thermal Resistance (R-Value): [Specify R-value.].

b. Combustion Characteristics (ASTM E136): Pass.

c. Loss on Ignition (ASTM C764): 1% or less by weight.

d. Critical Radiant Flux (ASTM E970): 0.11 Btu/ft^2 × s (0.12 W/cm^2) or greater.

e. Water Vapor Sorption (ASTM C1104): 5% or less.

f. Odor Emission (ASTM C1304): Pass.

g. Corrosiveness (ASTM C665, 13.8): Pass.

h. Fungi Resistance (ASTM C1338): Pass.

Specifier Note: Indicate appropriate recycled content based upon manufacturer's product literature.

i. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.

j. Prove through documentation that product passes CIWMB Section 01350 for indoor air quality.

Specifier Note: Fill in selected thickness in the subparagraph below from those available from manufacturer. If project includes multiple thicknesses, indicate below.

k. Thickness: [Specify thickness.].

l. Flamespread (ASTM E84): 25, maximum.

m. Smoke Developed (ASTM E84): 50, maximum.

n. Material Standard: ASTM C764.

C. Insulating Materials:

1. General: Provide insulating materials that comply with requirements and referenced standards.

a. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths and lengths.

2. Recycled Content: To meet the requirements of LEED Credit MR 4.1 [And MR 4.2], provide insulating materials complying with the following:

Specifier Note: Retain, edit or delete the following subparagraphs to suit project.

a. Credit MR 4.1: Provide insulating materials with post-consumer recycled content constituting a minimum of 5% of cost of materials used for project or post-consumer recycled content plus one-half of pre-consumer recycled content constituting a minimum of 10% of cost of materials used for project.

b. Credits MR 4.1 and MR 4.2: Provide insulating materials with post-consumer recycled content [Constituting a minimum of 10% of cost of materials used for project or post-consumer recycled content plus one-half of pre-consumer recycled content constituting a minimum of 20% of cost of materials used for project] [Constituting a minimum of 20% post-consumer recycled content plus 5% pre-consumer recycled content, consisting of a minimum of 25%].

Specifier Note: Edit Article below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 01 Project Requirements (Product Substitutions Procedures) Section.

2.02 PRODUCT SUBSTITUTIONS:

A. Substitutions: No substitutions permitted.

Specifier Note: Specify subordinate or secondary items that aid and assist primary products specified above or are necessary for preparation or installation of those items. Retain, edit or delete to suit project requirements and specifier practice.

2.03 ACCESSORIES

A. Tape: Self-adhesive vapor retarder tape with flamespread index of 25 or less, smoke developed index of 50 or less.

PART 3 EXECUTION

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the building insulation manufacturer.

Specifier Note: Specify actions to physically determine that conditions are acceptable to receive primary products of the section.

3.02 EXAMINATION

A. Site Verification of Conditions:

1. Verify that site conditions are acceptable for installation of building insulation.
2. Do not proceed with installation of building insulation until unacceptable conditions are corrected.

Specifier Note: Specify actions required to physically prepare the surface, area or site or to incorporate the primary products of the section.

3.03 PREPARATION

A. Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

Specifier Note: Coordinate article below with manufacturer's recommended installation requirements.

3.04 INSTALLATION

A. General: Comply with insulation manufacturer's written instructions applicable to products and application indicated.

1. Install insulation that is undamaged, dry and unsoiled and that has not been left exposed at any time to ice and snow.
2. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
3. Water Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
4. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required

to make up total thickness.

B. Installation of General Building Insulation:

1. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic or sealant as recommended by insulation manufacturer.
2. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
    a. Tape ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
3. Install glass-fiber blankets in cavities formed by framing members according to the following requirements:
    a. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
    b. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
    c. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
4. Wood-Framed Construction: Install mineral-fiber blankets in accordance with ASTM C1320 and as follows:
    a. With faced blankets having stapling flanges, secure insulation by friction fit inset or face stapling flanges to sides of framing members.
    b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to produce airtight installation after concealing finish material is in place.

Specifier Note: Coordinate following paragraph with Part 2 and Division 09 Acoustical Ceiling section. Delete if acoustical insulation is specified in Division 09 section or if acoustical insulation is not required for project.

5. Acoustical Insulation Installation: Install insulation where indicated in sound rated assemblies. Maintain acoustical rating of assembly.

Specifier Note: Coordinate following paragraph with Division 08 Curtain Wall section. Delete if board insulation is specified in Division 08 section or if board insulation is not required for project.

6. Board Insulation Installation: Install insulation where indicated:
    a. Cut and friction fit insulation between vertical or Z-shaped framing.
    b. Alternatively install insulation on impaling pins or with suitable adhesives.
    c. Place pins 3 inches - 5 inches (76 - 127 mm) from edges of insulation.

Specifier Note: Delete the following paragraph and associated subparagraphs if no loose fill insulation on project.

7. Loose-Fill Insulation: Place loose-fill insulation into spaces and onto surfaces as shown, either by pouring or by machine blowing to comply with ASTM C1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
    a. Stuff glass-fiber, loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40% of normal maximum volume equaling a density of approximately 2.5 pcf (40 kg/m^3).

C. Installation of Vapor Retarders:

1. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
2. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) oc.
3. Seal overlapping joints in vapor retarders with adhesives or vapor retarder tape according to vapor retarder

manufacturer's instructions. Seal butt joints and fastener penetrations with vapor retarder tape. Locate all joints over framing members or other solid substrates.

4. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor retarder manufacturer.
5. Seal joints caused by pipes, conduits, electrical boxes and similar items penetrating vapor retarders with vapor retarder tape to create an airtight seal between penetrating objects and vapor retarder.
6. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor retarder tape or another layer of vapor retarder.

Specifier Note: Specify provisions for protecting work after installation but prior to acceptance by the owner. Coordinate article below with Division 01 Execution Requirements Section.

3.05 PROTECTION

A. Protect installed work from damage due to subsequent construction activity on the site. Repair damage to installed products prior to installation of finish materials.

END OF SECTION