

**SECTION 07 21 23
LOOSE-FILL INSULATION**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between //--//if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. Provide net, unobstructed ventilation areas to attics over insulated ceilings:
 - a. For attics with vapor retarder, provide 0.1 square meter one square foot of net ventilation area for each 30 square meters 300 square feet of attic floor area.
 - b. For attics without vapor retarder, provide 0.1 square meter one square foot of net ventilation area for each 15 square meters 150 square feet of attic floor area.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers loose fill insulation, // vapor barrier // and all necessary blocking to install insulation // over ceilings // and // in attic spaces // where shown.
- B. Install insulation in sufficient thickness to provide thermal resistance "R" values of // "R"_____ above ceilings // and // "R"_____ in attics // "R"_____ as shown.

1.2 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIRMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // _____// requirements.

1.3 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT

- A. Products and Materials with Post-Consumer Content and Recovered Materials Content:
 1. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conserves/tools/cpg/products/>.

2. Materials or products specified by this section may be obligated to satisfy this Federal mandate and Comprehensive Procurement Guidelines program.
 3. The EPA website also provides tools such as a Product Supplier Directory search engine and product resource guides.
- B. Fulfillment of regulatory requirements does not relieve the Contractor of satisfying sustainability requirements stipulated by Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, as it relates to recycled content; additional product and material selections with recycled content may be required, as determined by Contractor's Sustainability Action Plan.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. Loose fill insulation in pint size containers.
 2. Blocking: 150 mm (6-inch) long strips.
 3. Vapor Retarder: 150 mm x 150 mm (6-inch by 6-inch) pieces.
- C. Manufacturer's Literature:
1. Submit current copies of the insulation manufacturer's printed fact sheet literature, including descriptive data, insulation characteristics, and instructions for installation and protection of insulation.
 2. Submit copy of "Bag Label".

1.5 SUSTAINABLE DESIGN CERTIFICATION

- A. Provide third party certified product in accordance with ULE Greenguard, SCS Scientific Certification Systems Indoor Advantage or equal. Certification must be current and performed annually.

1.6 DELIVERY

- A. Deliver materials to the site in the original sealed containers or packages bearing the manufacturer's name and brand designation.
- B. The containers or packages of insulation to bear the referenced specification number, type and class as applicable, recommended method of installation (pneumatic or pouring), minimum net weight of insulation, coverage charts, "R" values, and required warning statements.

1.7 STORAGE

- A. Inspect materials delivered to the site for damage and unload and store with a minimum of handling.
- B. Establish storage spaces in dry locations, not subject to open flames or sparks, and permitting easy access for inspection and handling.

SPEC WRITER NOTES:

1. Update the applicable publications at the time of the project specification preparation.

1.8 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

- B. American Society of Testing and Materials (ASTM):

C612-10	Mineral Fiber Block and Board Thermal Insulation
C728-13	Perlite Thermal Insulation Board
C739-11	Cellulosic Fiber Loose-Fill Thermal Insulation
C755	Selection of Water Vapor Retarders for Thermal Insulation
C764-11	Mineral Fiber Loose-Fill Thermal Insulation
C930-12	Potential Health and Safety Concerns Associated with Thermal Insulation Materials and Accessories
C1015-06(2011)e1	Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation
D4397-10	Polyethylene Sheeting for Construction, Industrial, and Agriculture Applications
E96/E96M-12	Water Vapor Transmission of Materials

- C. National Fire Protection Associations (NFPA):

211-13

Chimneys, Fireplaces, Vents, and Solid Fuel
Burning Appliances

- C. Scientific Certification Systems (SCS Global): SCS Indoor Advantage certification.
- D. UL Environment, GREENGUARD (ULE GREENGUARD): The GREENGUARD Product Guide (online)

1.9 SAFETY PRECAUTIONS

- A. Provide installers with dust/mist respirators, training in their use, and protective clothing.
- B. Consider other safety concerns and measures as outlined in ASTM C930.

PART 2 - PRODUCTS

SPEC WRITER NOTES:

1. Update material requirements to agree with the applicable requirements (types, grades, classes) specified in the referenced Applicable Publications.

2.1 LOOSE FILL INSULATION

- A. Cellulosic or Wood Fiber Loose Fill: ASTM C739.
- B. Mineral Fiber Loose Fill: ASTM C764, Type I or II.
- C. Prohibited Materials:
 1. Asbestos-containing materials.
 2. Urea Formaldehyde-containing materials.
 3. Ammonium Sulfate-containing materials.

2.2 BLOCKING

- A. Wood, metal, mineral fiber or perlite boards or other materials approved by the RE/COR.
- B. Mineral Fiber Board: ASTM C612, Type IB.
- C. Perlite Board: ASTM C728.

SPEC WRITER NOTES:

1. Determine the need for a water vapor retarder and its required permeance value based on a project and climate specific moisture analysis. For guidance see ASHRAE Handbook of Fundamentals, Chapter 20, "Thermal Insulations and Vapor Retarders;" ASTM C755, "Selection of Vapor Retarders for Thermal Insulations;" and UFC 3-440-05N, "Tropical Engineering" (for humid climates). The computer Program "MOIST" is a user friendly tool based on hourly weather data that provides information on moisture content of materials and on the duration of high

moisture content excursions. Traditionally, vapor retarders were considered materials having a permeance of 5.72×10^{-8} g/Pa.s.m² 1 perm (grain/h*ft²*in.Hg) or less. However, that value may not be adequate for the particular construction or climate and in some instances a much lower value should be specified.

2. Vapor retarders, where required, can be provided as membranes or, alternatively, vapor retardant finishes labeled by manufacturer as having a water vapor permeance of no more than the required value can be used. Alternate materials include: Paints, vinyl wall coverings, or foil-faced gypsum board. Specify these in the appropriate section and delete all paragraphs and references relating to vapor retarders from this section.
3. A vapor retarder is only effective if it prevents diffusion of water vapor as well as the passage of moisture laden air through openings and around material. Accordingly, proper installation to assure air tightness by sealing of joints, tears, and around utility penetrations is as important as proper selection of water vapor retarder materials.
4. Vapor retarders not only retard movement of water vapor into building envelope cavities, but also retard drying out of moisture that may have infiltrated the cavity. Accordingly, use vapor retarders only where their need is indicated by the moisture analysis.
5. Do not specify polyethylene membrane and other combustible membranes where they will be exposed to occupied or accessible spaces. Such vapor retarders must be covered to provide fire safety as required by applicable building codes.

2.3 VAPOR RETARDER

- A. Provide 0.15 mm thick polyethylene sheeting conforming to ASTM D4397 and having a water vapor permeance of 57.5 ng/Pa.s.sqm (1 perm) or less when tested in accordance with ASTM E96/E96M.
- B. Self-adhesive tape having a perm rating equal to the polyethylene.

2.4 RECOVERED MATERIAL

- A. Comply with following minimum content standards for recovered materials:

Material Type	Percent by Weight
Cellulose Loose-fill and spray-on	75 percent post-consumer recovered paper
Perlite composite board	23 percent post-consumer
Rock wool material	75 percent recovered material

- B. The minimum-content standards are based on the weight (not the volume) of the material in the insulating core only.

PART 3 - EXECUTION**3.1 INSPECTION**

- A. Where possible, inspect // attic(s) // and // ceiling(s) // to receive insulation for conditions which will adversely affect the execution of the work or create a safety hazard. Report unsatisfactory conditions to the RE/COR.
- B. Do not install insulation until unsatisfactory conditions have been corrected.
- C. Follow ASTM C1015 and check for the following:
1. Defects in electrical fixtures, equipment, wiring, junction boxes, receptacles, and switches that will cause hazards.
 2. Openings through which the loose fill insulation material may escape.
 3. Air ducts which appear to have joints that are not secure or sealed.

3.2 PREPARATION

- A. Prior to the installation of insulation, provide blocking as specified herein and in accordance with ASTM C1015.
- B. Install blocking around // attic trap door(s), // ceiling access-panel(s), // and // vents // if the level to which the unsettled insulation will be installed exceeds their height. Cover openings into the attic with temporary blocking to prevent insulation from falling into the opening, including spaces enclosed by blockings.
- C. Install blocking around heat producing devices with minimum clearances as specified herein.
1. Install blocking 50 mm (two inches) above the height of the finished insulation installation and in a manner that ensures that devices

which may require maintenance or servicing remain accessible after the insulation is installed.

2. Minimum clearances for blocking around heat producing devices to be as follows:
 - a. Masonry chimneys for equipment and incinerator(s) operating at a temperature of not more than 800 degrees C (1500 degrees F): 100 mm (Four inches) from the outside face of the masonry.
 - b. Vents, chimney and vent connectors, and chimneys other than masonry chimneys: Minimum clearances as required by NFPA 211.

3.3 INSTALLATION

A. Vapor Retarder:

1. //Where space is accessible, //install vapor retarder below insulation. Do not install a vapor retarder over existing insulation or where there is a vapor retarder under existing insulation.
2. Take care to prevent tears, breaks, or ruptures of any kind which might interfere with the effectiveness of the vapor retarder, and install in a manner which will assure a continuous seal.
3. Lap joints or breaks in vapor retarder in a manner that will assure a vapor retarder capable of effectively controlling moisture transmission. Tape laps to retain vapor barrier in place.
4. Use self-adhesive tape for laps and for sealing breaks and holes in the vapor retarder.

B. Insulation:

1. Install insulation in accordance with ASTM C1015 and the requirements specified.
2. Do not install insulation until the requirements specified in the INSPECTION and PREPARATION paragraphs have been carried out and any defects which were identified have been corrected and their cause eliminated.
3. Pneumatic installation of thermal insulation must comply with OSHA. Supply and utilize the personnel protective equipment and engineering controls necessary for a safe effective installation. Use only pneumatic equipment in accordance with the manufacturer's instructions.
4. Install the insulation allowing it to settle to its natural density. Do not tamp or rod the insulation.

SPEC WRITER NOTES:

1. Insure space over insulation is vented. For preliminary design use an "R" value of 3.1 per 25 mm (inch) for calculation of minimum thickness of insulation. Since density will vary from 9.5 to 32 Kg/m³ (0.6 to 2.0 pounds per cubic foot) and the insulation will settle after blowing, the initial thickness will exceed the maximum thickness; thus bag count is critical.
 5. Install insulation in sufficient depth to provide the thermal value specified after settlement of the insulation. To obtain a minimum "R" value of _____ or as shown, install insulation to a minimum thickness of _____ mm (_____ inches) or as shown, using the number of bags per 90 m² (1000 squares feet) as shown on the manufacturer's "Bag Label".
 6. For pneumatic installations, use the least air pressure meeting the manufacturer's instructions.
 7. Do not blow the insulation into electrical devices and vents which open into the attic and other spaces to be insulated.
 8. Fit the attic side of // trap doors // and // access panels // with perlite or mineral fiber insulation boards. // Insulate the attic side of trap doors unless prevented by a retractable ladder. //
- C. Post Installation Procedures:
1. In accordance with ASTM C1015.
 2. Remove temporary blockings over vent openings in attic(s).

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