

**SECTION 07 21 13
THERMAL 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.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies thermal and acoustical insulation for buildings.
- B. Acoustical insulation is identified by thickness and words "Acoustical Insulation".

1.2 RELATED WORK

- A. Insulation for Insulated Wall Panels: Section 07 40 00, ROOFING AND SIDING PANELS.
- B. Insulation in connection with roofing and waterproofing: Section 07 22 00, ROOF AND DECK INSULATION.
- C. Insulation for prefabricated metal buildings: Section 13 34 19, METAL BUILDING SYSTEMS.
- D. Insulating Concrete Systems: Section 03 52 00, LIGHTWEIGHT CONCRETE ROOF INSULATION.
- E. Safing Insulation: Section 07 84 00, FIRESTOPPING.

1.3 SUSTAINABILITY REQUIREMENTS

- A. Materials in this section may contribute towards contract compliance with sustainability requirements. See Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS, for project // local/regional materials, // low-emitting materials, // recycled content, // certified wood // ____// requirements.
- B. Biobased Material: For products designated by the USDA's BioPreferred® program, provide products that meet or exceed USDA recommendations for biobased content, subject to the products compliance with performance requirements in this Section. For

more information regarding the product categories covered by the BioPreferred® program, visit <http://www.biopreferred.gov>.

1.4 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/conservation/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.

1.5 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Insulation, each type used.
 - 2. Adhesive, each type used.
 - 3. Tape.
- C. Certificates: Stating the type, thickness and "R" value (thermal resistance) of the insulation to be installed.

1.6 SUSTAINABLE DESIGN CERTIFICATION

- A. Provide third party certified product in accordance with ULE GREENGUARD, SCS Global Indoor Advantage Certification or equal; certification must be current and performed annually.
- B. Provide documentation to demonstrate fiberglass insulation does not contain urea-formaldehyde.

1.7 STORAGE AND HANDLING

- A. Store insulation materials in weathertight enclosure.
- B. Protect insulation from damage from handling, weather and construction operations before, during, and after installation.

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 for Testing and Materials (ASTM):

C270-19ae1	Mortar for Unit Masonry
C553-11	Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
C553-13(2019)	Rigid, Cellular Polystyrene Thermal Insulation
C591-21	Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation

- C665-12 Mineral Fiber Blanket Thermal Insulation
for Light Frame Construction and
Manufactured Housing
- D312/D312M-16a Asphalt Used in Roofing
- F1667/F1667M-21a Driven Fasteners: Nails, Spikes and Staples
- C. Scientific Certification Systems (SCS Global): SCS Indoor
Advantage certification.
- D. UL Environment, GREENGUARD (ULE GREENGUARD): The GREENGUARD
Product Guide (online)

SPEC WRITER NOTES:

1. Make material requirements agree with applicable requirements specified in the referenced Applicable Publications applies to the project. Determine "R" value required, based on U value used for design by HVAC. Generally, indicate "R" value required for thermal insulation on drawings instead of thickness and specify only these insulations which will meet the "R" value for thickness shown in space available. Allow options where possible.

PART 2 - PRODUCTS

2.1 INSULATION - GENERAL

- A. Where thermal resistance ("R" value) is specified or shown for insulation, the thickness shown on the drawings is nominal. Use only insulation with actual thickness that is not less than that required to provide the thermal resistance specified.
- B. Where "R" value is not specified for insulation, use the thickness shown on the drawings.
- C. Comply with following minimum content standards for recovered materials:

Material Type	Percent by Weight
Polyisocyanurate/polyurethane/polystyrene	9 percent recovered material
Glass fiber reinforced	6 percent recovered material

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

SPEC WRITER NOTES:

1. Specify board-type insulations for masonry and concrete walls and under concrete floor slabs. Also specify board-type insulation where the type of construction favors their economical usage, and their application would be less difficult than blanket or loose fill insulations. Drawings must indicate locations and type of insulation.

E. Insulation Products shall comply with following standards for biobased materials:

Material Type	Percent by Weight
Fiberglass Insulation	5 percent biobased material
Spray Foam Insulation	7 percent biobased material

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

2.2 POLYISOCYANURATE BOARD INSULATION

A. ASTM C591, Type I, faced with a vapor retarder having a perm rating of not more than 0.5.

2.3 POLYSTYRENE BOARD

- A. ASTM C578, Type X for cavity walls.
- B. ASTM C578, Type IV, V, VI, VII, or IX were covered by soil or concrete.

SPEC WRITER NOTES:

1. Review USDA Biopreferred Categories for listed materials within the scope of the following subsection and include additional

requirements, unless justification for non-use exists.

2.4 GLASS FIBER AND STONE WOOL INSULATION

- A. Unfaced Insulation: ASTM C665, Type I or ASTM C533.
- B. Faced Insulation: ASTM C665, Type III, Faced.
- C. Acoustical Insulation: Preformed, friction-fit type, unfaced; insulation type conforming to ASTM C665 or C553.

2.5 FASTENERS

- A. Staples or Nails: ASTM F1667, zinc coated, size and type best suited for purpose.

SPEC WRITER NOTES:

1. Review USDA Biopreferred Categories for listed materials within the scope of the following subsection and include additional requirements, unless justification for non-use exists.

2.6 ADHESIVE

- A. As recommended by the manufacturer of the insulation.
- B. Asphalt: ASTM D312, Type III or IV.
- C. Mortar: ASTM C270, Type 0.

2.7 TAPE

- A. Pressure sensitive adhesive on one face.
- B. Perm rating of not more than 0.50.

2.8 BLOCKING AROUND HEAT PRODUCING DEVICES

- A. Provide non-combustible blocking around heat producing devices to provide the following clearances:
 1. Recessed lighting fixtures, including wiring compartments, ballasts, and other heat producing devices, unless certified for installation surrounded by insulation: 75 mm 3 inches from outside face of fixtures and devices or as required by NFPA 70 and, if insulation is to be placed above fixture or device, 600 mm 24 inches above fixture.
 2. Vents and vent connectors used for venting products of combustion, flues, and chimneys: minimum clearances as required by NFPA 211.

PART 3 - EXECUTION**3.1 INSTALLATION - GENERAL**

- A. Install insulation with the vapor barrier facing the heated side, unless specified otherwise.
- B. Install rigid insulating units with joints close and flush, in regular courses and with cross joints broken.
- C. Install batt insulation with tight joints and filling framing void completely. Seal cuts, tears, and unlapped joints with tape.
- D. Fit insulation tight against adjoining construction and penetrations, unless specified otherwise.
- E. Do not install insulation in a manner that would sandwich electrical wiring between two layers of insulation.
- F. Place insulation to the outside of pipes.
- G. Butt tightly against adjoining boards, studs, rafters, joists, sill plates, headers and obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joint, roof, and floor. Avoid creating any thermal bridges or voids.

3.2 POLYISO BOARD

- A. Bond polyisocyanurate board, to surfaces with adhesive as recommended by insulation manufacturer.

3.3 POLYSTYRENE BOARD

- A. Vertical Insulation:
 - 1. Fill joints of insulation with same material used for bonding.
 - 2. Bond polystyrene board to surfaces with adhesive and applied in accordance with recommendations of insulation manufacturer.

3.4 GLASS FIBER BATT

- A. Pack insulation around door frames and windows and in building expansion joints, door soffits and other voids. Pack behind outlets around pipes, ducts, and services encased in walls. Open voids are not permitted. Hold insulation in place with pressure sensitive tape.
- B. Lap vapor retarder flanges together over face of framing for continuous surface. Seal all penetrations through the insulation.

- C. Fasten blanket insulation between metal studs or framing and exterior wall furring by continuous pressure sensitive tape along flanged edges.

SPEC WRITER NOTES:

Attic Ventilation:

1. Provide net, unobstructed attic ventilation areas over insulated ceilings as recommended by ASHRAE Handbook of Fundamentals, Chapter 21, and as follows:
2. 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.
3. 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.
4. For insulation of cathedral ceilings, provide at least a 50 mm 2-inch gap between upper face of insulation and underside of roof sheathing. Provide ventilation openings at bottom and top of ventilated cavity; show on drawings.

- D. Roof Rafter Insulation or Floor Joist Insulation: Place mineral fiber blankets between framing to provide not less than a 50 mm (two inch) air space between insulation and roof sheathing or subfloor.

E. Ceiling Insulation and Soffit Insulation:

1. Fasten blanket insulation between wood framing or joist with nails or staples through flanged edges of insulation.
2. At metal framing or ceilings suspension systems, install blanket insulation above suspended ceilings or metal framing at right angles to the main runners or framing. Tape insulation tightly together so no gaps occur, and metal framing members are covered by insulation.
3. In areas where suspended ceilings adjoin areas without suspended ceilings, install blanket, batt, or mineral fiberboard extending from the suspended ceiling to underside

of deck or slab above. Secure in place to prevent collapse or separation of hung blanket, batt, or board insulation and maintain in vertical position. Secure blanket or batt with continuous cleats to structure above.

3.5 ACOUSTICAL INSULATION

- A. Fasten blanket insulation between metal studs and wall furring with continuous pressure sensitive tape along edges or adhesive.
- B. Pack insulation around door frames and windows and in cracks, expansion joints, control joints, door soffits and other voids. Pack behind outlets, around pipes, ducts, and services encased in wall or partition. Hold insulation in place with pressure sensitive tape or adhesive.
- C. Do not compress insulation below required thickness except where embedded items prevent required thickness.
- D. Where acoustical insulation is installed above suspended ceilings install blanket at right angles to the main runners or framing. Extend insulation over wall insulation systems not extending to structure above.

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