

Seaside Rehabilitation and Health Care Center
Portland, Maine

SECTION 072100 - BUILDING INSULATION

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. Foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Foam-in-place insulation.
4. Insulation in frames of steel doors.
5. Vapor retarders.
6. Z- and J-furring for rigid insulation at exterior masonry walls.

B. Related Sections:

1. Division 06 Section "Rough Carpentry" for fire-retardant wall sheathing applied over rigid insulation.
2. Division 06 Section "Finish Carpentry" for Z-flashing over windows and doors to be sealed to the air barrier waterproofing.
3. Division 07 Section "Spray-In-Place Rigid Urethane Foam Insulation."
4. Division 07 Section "Under-Slab Vapor Retarders."
5. Division 07 Section "Thermoplastic Polyolefin (TPO) Roofing" for insulation specified as part of roofing construction.
6. Division 09 Section "Gypsum Board Assemblies" for provision in metal-framed assemblies of acoustical insulation.
7. Divisions 22 and 23 Sections for insulation on ducts, piping, and equipment.

1.3 DEFINITIONS

- A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "r-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
1. VOC Content of Sealants: For sealants used inside the weatherproofing system, include a printed statement of the VOC content.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

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- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency and bearing UL label. Identify products with appropriate markings of applicable testing agency.

1.6 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 before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 FOAM-PLASTIC BOARD INSULATION

- A. Under Slab and Perimeter Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 25 psiof type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 - 1. Edge Condition: As follows:
 - a. Under Slab Insulation: Square edge.
 - b. Perimeter Insulation: Tongue and groove or shiplap edges
 - 2. Thickness: 2 inch, unless indicated otherwise.
 - 3. LTTR-Value: ASTM C 518; 10.6 for 2 inch thick board.
 - 4. Products:
 - a. Foamular 250; Owens Corning.
 - b. GreenGuard; Pactiv Building Products.
- B. Rigid Insulation for Installation over Air Barrier Waterproofing on Weather-Resistant Gypsum Sheathing applied to Cold-Formed Framing and Over Z-Furring at Masonry Walls:
 - 1. Edge Condition: Tongue and groove or shiplap edges.
 - 2. Board Widths: 4 feet.
 - 3. Thickness: 1-inch.
 - 4. LTTR-Value: ASTM C 518; 5.0 for 1 inch thick board.
 - 5. Products:
 - a. Foamular 250; Owens Corning.
 - b. GreenGuard; Pactiv Building Products.

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- C. Rigid Insulation for Installation in Z-Furring: Extruded-polystyrene board insulation, ASTM C 578, Type IV, 25 psi, unless otherwise indicated, with maximum flame-spread and smoke-developed indices of 75 and 450, respectively:
 - 1. Edge Condition: Square edges.
 - 2. Board Widths: 16 inches.
 - 3. Thickness: 2 inches.
 - 4. LTTR-Value: ASTM C 518; 10.6 for 2 inch thick board.
 - 5. Products:
 - a. Foamular 250; Owens Corning.
 - b. GreenGuard; Pactiv Building Products.

- D. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

2.3 GLASS-FIBER BLANKET (BATT) INSULATION

- A. Manufacturers:
 - 1. CertainTeed Corporation.
 - 2. Knauf Insulation.
 - 3. Owens Corning.

- B. Unfaced, Glass-Fiber Blanket (Batt) Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. Provide in thickness for full depth of cavity. Where cavity requires insulation that is thicker than standard size, install next larger size and compress into cavity.
 - 1. Provide insulation in standard density except as noted otherwise.
 - 2. Provide insulation with following minimum R-values:
 - a. Walls: R-19.

2.4 FOAM-IN-PLACE INSULATION

- A. Foam-In-Place Insulation, General Use: On-site foam-in-place insulation shall be Class 1 foam.
 - 1. Products:
 - a. Froth-Pac; Dow Chemical Company (The).
 - b. Touch 'n Foam Gun Foam Sealant; Convenience Products.

- B. Polyurethane Foam Insulation (Minimal Expansive) for Window and Door Perimeters: Single- or two-component, UL classified sealant, to insulate, seal, fill, and stop air infiltration; shall not expand to the point to cause pressure on window and door jambs.
 - 1. Density: ASTM D 1622, 1.0 - 1.8 lbs./cu. ft.
 - 2. R-Value: ASTM C 518, not less than 4.0 per inch of thickness.
 - 3. Fire-Test-Response Characteristics: ASTM E 84, as follows:
 - a. Flame Spread: Not greater than 25.
 - b. Smoke Developed: Not greater than 50.
 - 4. Products:
 - a. Dow Chemical Company (The); Great Stuff PRO Window & Door.
 - b. Fomo Products Inc.; Handi-Seal Window and Door Sealant.
 - c. Convenience Products; No-Warp Foam Window & Door Insulating Sealant.

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2.5 VAPOR RETARDERS

- A. Vapor Retarders: CertainTeed MemBrain vapor retarder sheeting.
 - 1. Material: Polyamide (nylon) sheet, 2-mil thickness.
 - 2. Fire Resistance ASTM E84: Flame Spread Index 20; Smoke Developed Index 55.
 - 3. Vapor Permeance: ASTM E96, Less than 1. ASTM C665, greater than 10 at 60% RH.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- C. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.
- D. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.
 - 1. VOC Content of Interior Sealants: Provide interior sealants with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Adhesive for Bonding Vapor Retarder to Adjacent Construction: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
 - 1. VOC Content of Interior Adhesives: Provide interior adhesives with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Air-Vapor Barrier Box (Box Gasket): Air-vapor barrier box, constructed of high strength polyethylene with sealing flanges to permit installation of electrical boxes, insulation, and installation of wallboard without damage to vapor barrier.
 - 1. Coordinate installation and provide installation instructions to electrician during electrical rough-in.
 - 2. Location: Penetrations in vapor retarder.
 - 3. Product: LESSCO Air-Vapor Barrier Box; Lessco Low Energy Systems Supply Co., Inc., Campbellsport, WI 53010; phone: 920-533-8690; e-mail: LESSCO@lessco-airtight.com.

2.6 METAL FURRING

- A. Steel Sheet Components: Complying with ASTM A 1003/A 1003M, Structural Grade, Type H, G90 metallic coating.
- B. Z-Shaped and J-Shaped Furring: With nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, bare metal thickness of not less than 0.053-inch (16 gage), and depth required to fit insulation thickness indicated.
- C. Fasteners for Fastening Furring to CMU: Buidex Tapcon concrete anchors.

2.7 AUXILIARY INSULATING MATERIALS

- A. Insulation Support Anchor: 25 gage, galvanized continuous metal support strip with pre-punched tabs at 8 inches on center.
 - 1. Product: Insul-hold; Insul-Hold Co., Inc.; phone (207) 465-9066.

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- B. Rigid Insulation Tape: Moisture-resistant tape with UV-treated, polyethylene-film-reinforced top surface laminated to acrylic backer with release paper backing; use product by or approved by rigid insulation manufacturer for sealing joints in insulation.
 - 1. Width: Not less than 3-1/2 inches.
 - 2. Product: Owens Corning; Joint SealR Foam Joint Tape.
- C. Rigid Insulation Adhesive: Sto TurboStick single component polyurethane foam adhesive, compatible with air barrier waterproofing.
 - 1. Application Temperature: 35 degrees F minimum surface and ambient temperature.
- D. Rigid Insulation Mechanical Fasteners: Self-drilling screw fasteners, stainless steel or corrosion resistant coated with CR-10 organic-polymer coating, with minimum 2 inch diameter plastic plates as manufactured by OMG Roofing Products or approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing 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 indicated. Butt joints tight and fasten in place to prevent displacement during the installation of work that conceals insulation. Fill voids in thermal envelope not covered by the work of other sections.
 - 1. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with installation of insulation.
- 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. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- E. Cut insulation straight and square using straight edge and square guide. Butt joints shall be tight and free of gaps .

3.3 INSTALLATION OF BELOW-GRADE INSULATION

- A. On vertical footing and foundation wall surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
 - 1. Extend insulation to top of footing, unless otherwise indicated.
 - 2. Seal end-to-end joints between units by applying sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with sealant as recommended by insulation manufacturer.

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- B. On horizontal surfaces under slabs, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units. Insulate under entire slab.

3.4 INSTALLATION OF METAL FURRING AND RIGID INSULATION

- A. At walls framed with cold-formed framing, install tongue-and-groove rigid insulation over wall sheathing with the tongue facing up. Offset end joints by not less than 2 feet from board below. Tape horizontal and vertical joints in insulation with tape centered over joint. Roll tape firmly in place to ensure intimate contact. Insulation shall be attached to the wall using one of the following methods:
 - 1. Rigid Insulation Adhesive: Apply vertical adhesive ribbons to back of insulation board, located approximately 3/4-inch from both ends, and 5 additional ribbons spaced equally about 7 inches apart. Position board and lightly press board on to wall. Hold boards into place with mechanical fasteners as required to prevent board movement and displacement.
 - 2. Rigid Insulation Mechanical Fasteners: Fasten insulation with corrosion resistant screws with plastic stress plates spaced 16 inches on center along board edge and 24 inches on center in the field of the board so insulation stays in tight intimate contact with wall substrate. Drive fasteners so the stress plate is tight and flush with the board surface but do not countersink. Stress plates can bridge between adjoining board edges if the plate is a minimum of 1-3/4 inch diameter. Do not fasten more than two board edges with one stress plate.
 - a. Note: Vinyl siding attachment is not acceptable substitute to insulation attachment specified above. Vinyl siding is hung, so fasteners are not drawn tight to wall that would hold insulation in tight contact with the wall.
- B. At masonry walls, install J-furring along bottom of wall and install rigid insulation vertically holding it in place with Z-furring members spaced 16 inches o.c. Fasten Z-furring members securely into CMU. Cover Z-furring and insulation with second layer of 4 foot by 8 foot rigid insulation installed perpendicular to first layer. Offset end joints so they do not land over Z-furring.
- C. Cut rigid insulation flush with top of window and door trim to permit installation of z-flashing run back to air barrier waterproofing. After top flashing has been sealed to air barrier waterproofing, set rigid insulation tight to top of flashing and continue up wall.
- D. During installation, fill cracks and gaps between rigid insulation boards and between rigid insulation boards and adjacent construction with foam-in-place insulation sealant and trim flush with face of board.

3.5 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units. Fill voids in thermal envelope not covered by the work of other sections.
- B. Glass-Fiber Blanket (Batt) Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Install insulation support anchors at top of cavity and spaced 5 feet on center full length of each cavity.

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2. 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.
3. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - a. Voids in exterior framing headers to be filled with spray-applied urethane foam insulation provided in Division 07 Section "Spray-In-Place Rigid Urethane Foam Insulation."

- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Loose-Fill Insulation: Compact to approximately 40 percent of normal maximum volume equating a density of approximately 2.5 lb/cu. ft.
 2. Voids in exterior framing headers to be filled with spray-applied urethane foam insulation provided in Division 07 Section "Spray-In-Place Rigid Urethane Foam Insulation."

3.6 INSTALLATION OF FOAM-IN-PLACE INSULATION SEALANT

- A. Install foam-in-place insulation sealant to a minimum depth of 1 inch, sealing roof deck flutes and construction cracks and gaps where outside air and cold can infiltrate, providing an airtight building envelope. Fill cracks and gaps between rigid insulation boards and between rigid insulation boards and adjacent construction.

3.7 INSULATING STEEL DOOR FRAMES

- A. Exterior Frames: Steel door frames in exterior steel framed walls shall be filled with rigid insulation. Cut rigid insulation slab the full width of frame throat and insert continuous slab into door frame head and jambs before frame is installed.
1. After frame is installed, fill remaining gap between rigid insulation and weather barrier with foam-in-place insulation.
 2. Foam remaining gaps with minimal expanding foam.

3.8 INSTALLATION OF VAPOR RETARDERS

- A. Air-Vapor Barrier Box: Installation: Seal vapor retarder to air-vapor barrier box in accordance with manufacturer's instructions, <http://www.lessco-airtight.com/instructions.htm>. Seal completely around wires with silicone sealant. If the hinged box option is used by electrical box installer, the cut made at top and bottom of the box shall be taped shut with 3M Contractor's Sheathing Tape. Cut vapor retarder at center of flanges of air-vapor barrier box and tape the vapor retarder to flanges of the air-vapor barrier box with vapor barrier tape, assuring tape is folded into the insides of the air-vapor barrier box.
1. Insulate around the electrical box inside the air-vapor barrier box with fiberglass insulation, filling all voids around electrical box.
- B. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders continuously over exterior framing prior to installation of interior framing to protect from vapor transmission. Secure vapor retarders in place with spray adhesives, double sided tape, or other anchorage system that will vapor retarder in proper position . Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with spray-applied foam insulation and loose-fiber insulation.
1. Seal vapor barrier to electrical wall boxes.

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- C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two framing members.
 - 1. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
 - 2. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.
 - 3. Seal perimeter of vapor barrier and the perimeter of all openings in vapor barrier to framing with continuous bed of adhesive prior to fastening vapor barrier to framing.
- D. 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 retarders.
- E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.9 PROTECTION

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