

SECTION 07 20 00

THERMAL PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Foundation Wall and Under Slab Insulation
2. Masonry Cavity Wall Insulation
3. Batt Insulation
 - a. Unfaced
 - b. Faced
 - 1) Abuse Resistant Vapor-Retarder Facing: Metallized Polypropylene Film

B. Related Sections:

1. Section 06 10 00 - Rough Carpentry
2. Section 07 62 00 - Sheet Metal Flashing and Trim
3. Section 07 84 00 - Firestopping
4. Section 09 21 16 - Gypsum Board Assemblies
5. Division 22 - Plumbing Insulation
6. Division 23 - HVAC Insulation

1.02 REFERENCES

A. [ASTM International](#) Publications:

1. C578 "Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation"
2. C665 "Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing"
3. D4397 "Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications"
4. E84 "Standard Test Method for Surface Burning Characteristics of Building Materials"
5. E96 "Standard Test Methods for Water Vapor Transmission of Materials"
6. E119 "Standard Test Methods for Fire Tests of Building Construction and Materials"
7. E136 "Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C"
8. E1677 "Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls"
9. E1745 "Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs"

B. [Code of Federal Regulations \(CFR\)](#) Publications:

1. 40 [CFR](#) 763, "Asbestos: Appendix A - Transmission Electron Microscopy Analytical Methods"

C. [Underwriter's Laboratories, Inc. \(UL\)](#) Standards

1. "Fire Resistance Directory"

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1.03 DEFINITIONS

- A. Thermal Resistivity: Where thermal resistivity properties of insulation materials are designated by r-values, they represent the rate of heat flow through a homogeneous material exactly 1" thick, measured by test method included in referenced material standard or otherwise indicated. They 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.

1.04 SUBMITTALS

- A. Submit the following:
 - 1. Product Data for each type of product.
 - 2. Certified Test Reports: With product data, submit copies of certified test reports showing compliance with specified performance values, including R-values (aged values for plastic insulations), densities, compression strengths, fire performance characteristics, perm ratings, water absorption ratings and similar properties.

1.05 QUALITY ASSURANCE

- A. Fire Test Response Characteristics: Provide insulation materials which are identical to those whose fire-test-response characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by [UL](#) or other testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Surface Burning Characteristics: [ASTM E84](#)
 - 2. Fire Resistance Ratings: [ASTM E119](#)
 - 3. Combustion Characteristics: [ASTM E136](#)
- B. Asbestos Content of Inorganic Insulations: provide insulations composed of mineral fibers or mineral ores which contain no asbestos of any type of mixture of types occurring naturally as impurities as determined by polarized light microscopy test per Appendix A of 40 [CFR 763](#).
- C. All insulation in roof and wall assemblies shall be approved for use without an additional thermal barrier in accordance with Local Building Codes.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver insulation in original labeled bundles.
- B. General Protection: Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage, and protection during installation.
- C. Protection for Plastic Insulation:
 - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time.
 - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

1.07 PROJECT CONDITIONS

- A. The Installer must examine the substrate and the conditions under which insulation work is to be performed and notify the Architect in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Weather Conditions: Proceed with work only when weather conditions are in compliance with manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with requirements and the manufacturer's recommendations.

- C. Do not apply insulation to damp, frozen, dirty, dusty, or surfaces unacceptable to manufacturer.
- D. Coordinate this work with all trades and protect it after installation.

PART 2 PRODUCTS

2.01 INSULATING MATERIALS

- A. General: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.
- B. Extruded Polystyrene Board (XPS) Insulation - Masonry Cavity Walls, Foundation Walls, and Under Slab:
 - 1. Approved Manufacturers:
 - a. "FOAMULAR High-R CW Plus Extruded Polystyrene Foam Insulation"; [Owens Corning](#) (800-438-7465)
 - b. "STYROFOAM CAVITYMATE Ultra Extruded Polystyrene Foam Insulation"; [Dow Chemical Company](#) (800-441-4369)
 - c. Approved substitution
 - 2. Rigid, cellular polystyrene thermal insulation with closed-cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with [ASTM](#) C578 for Type indicated; with 180 day aged R-values per inch of 6.1 and 5.6 at 40 and 75 deg. F., respectively; and as follows:
 - a. Type IV, 1.6 lb./cu. ft. min. density, unless otherwise indicated.
 - 3. Surface Burning Characteristics in accordance with [ASTM](#) E84:
 - a. Flame Spread: 75
 - b. Smoke Developed: <450
 - 4. Panel width: 16-inches wide.
 - 5. Thickness: As indicated on Drawings.
 - 6. Adhesive: Type recommended by insulation board manufacturer for application indicated.
- C. Metal Building Insulation:
 - 1. Approved Manufacturers:
 - a. [Johns-Manville](#) (800-654-3103)
 - b. [Owens-Corning](#) (800-438-7465)
 - c. [CertainTeed Corp](#) (800-223-8990)
 - d. "[Knauf Insulation GmbH](#) (800-825-4434)
 - e. No Substitution.
 - 2. [ASTM](#) C991, Type I, or NAIMA 202, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch-wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less
 - a. Roof Insulation
 - 1) Provide 7" double layer system. One layer 3-1/2" unfaced insulation on 3-1/2" layer metallized polypropylene film faced insulation.
 - b. Wall Insulation
 - 1) Provide insulation as indicated on Drawings.
- D. Abuse Resistant Vapor-Retarder Facing: Metallized Polypropylene Film.

1. Approved Manufacturers:
 - a. "GYMGUARD": [Lamtec Corporation](#), (800-852-6832)
 - b. Approved Substitution
2. Composition: Facing shall be composed of 0.0015" white metallized polypropylene film laminated to a fiberglass/polyester blend fabric with a fire resistant adhesive. The resulting facing shall have a water vapor transmission rate of 0.02 US perm ([ASTM E96](#), Procedure A), and a mullen burst of 250 P.S.I. Tensile strength shall be 195# in the machine direction and 150# in the cross-machine direction.
3. Composite fiberglass insulation and facing:
 - a. Flame Spread not to exceed 25
 - b. Smoke developed not more than 5
4. Provide facing 3" wider than blanket on both edges.
5. Width: As required for installation.

2.02 INSULATION ACCESSORIES:

- A. Type and size to suit application.
- B. Retainer Strips: 0.025-inch nominal-thickness, formed, metallic-coated steel or PVC retainer strips colored to match insulation facing.
- C. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- D. Insulation Fasteners: Steel impale spindle and clip on flat metal base, self adhering backing, length to suit insulation thickness, capable of securely and rigidly fastening insulation in place.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Require Installer to examine substrates and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the section in which substrate and related work is specified. Obtain Installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.
 1. Verify adjacent materials are dry and ready to receive insulation.
 2. Verify mechanical and electrical services within insulated spaces have been installed and tested.
 3. Verify substrate surface is flat, free of honeycomb, fins, irregularities, and materials that will impede adhesive bond.
- B. Installation of insulation signifies contractor acceptance of substrate.

3.02 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections which might puncture vapor retarders.

3.03 INSTALLATION - GENERAL

- A. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specified recommendations before proceeding with work.
 1. Verify insulation boards are unbroken and free of damage.

- B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.
- C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.
- D. Trim insulation neatly to fit spaces. Use boards free of damage.
- E. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.
- F. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

3.04 INSTALLATION - PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type of adhesive recommended by manufacturer of insulation.
- B. Protect top surface of horizontal insulation (from damage during concrete work) by application of protection board.

3.05 INSTALLATION - GENERAL BUILDING INSULATION

- A. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Set vapor retarder faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure air-tight installation.
- C. Install glass fiber blankets in cavities formed by framing members according to the following requirements.
 - 1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3.06 INSTALLATION - CAVITY-WALL INSULATION

- A. On units of foam-plastic board insulation, install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates indicated.
- B. Seal butt joints and fastener penetrations with tape of type recommended by insulation board manufacturer.

3.07 INSTALLATION - METAL BUILDING SYSTEMS

- A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.
 - 1. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 - 2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
 - 3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths with both sets of facing tabs sealed to provide a complete vapor retarder.

4. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation with both sets of facing tabs sealed to provide a complete vapor retarder.
- B. Blanket Roof Insulation: Comply with the following installation method:
1. Two-Layers-between-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder facing tabs up and over purlin, overlapping adjoining facing of next insulation course maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
 2. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
 3. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
- C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing members. Hold in place by metal wall panels fastened to secondary framing.
1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
 2. Retain insulation in place by adhesive within integral pockets within metal wall panels, or metal clips and straps spaced at intervals recommended by insulation manufacturer to hold insulation securely in place. Maintain cavity width between insulation and metal liner panel of dimension indicated.
- 3.08 PROTECTION
- A. General: Protect installed insulation and vapor retarders from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

END OF SECTION 07 20 00