SPECIAL SPECIFICATION

SECTION 07200S

BUILDING INSULATION

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BUILDING INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Section Includes:

1. Perimeter and Under-Slab Insulation.

2. Frame Wall and Ceiling Insulation.

3. Pre-Engineered Building Insulation.

4. Cavity Wall and Masonry Cell Insulation.

B. Related Sections: Refer to Division 7, Sections "Single-Ply Roofing – TPO" for roofing insulation requirements.

1.02 ENVIRONMENTAL OBJECTIVES

A. As described in section 01805S "Environmental Objectives", the owner has determined that this project be rated by LEED™ Version 2.0 green building rating system, which was issued in March 2000 by the U.S. Green Building Council, 1015 18th Street, NW, Suite 805, Washington, DC 20036. Phone: 202/ 82-USGBC (828-7422) Fax: 202/ 828-5110

B. The design has been pre-scored by the Design Team, using the LEED™ rating system, in anticipation of submitting the buildings for certification as a "green" building. The Sustainable Design Report, **a reference document to be used** with the Contract Documents, represents the results of the sustainable design efforts for the MESA Complex and a pre-score of the LEED™ rating. LEED™ is a performance-based rating system, which gives points for those sustainable design elements incorporated into the final design.

C. While these goals and implementation strategies are incorporated within the Contract Documents, suggestions and input from the contractor for implementing these goals are encouraged. A team approach is encouraged.

D. Manufacturer/ Fabricator to supply documentation of level of compliance or non-compliance with the following requirements and objectives before consideration as an "Acceptable Manufacturer".

E. The Design Team has determined that the following be mandatory requirements:

a. Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51.

b. The product(s) supplied is to have a minimum weighted average of 20% post consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material.

c. Comply with the requirements of section 01505S "Construction Waste Management"

F. The Design Team has determined that the following be a highly desirable objective:

a. The product(s) supplied is manufactured/fabricated within a radius of 500 miles from the project site AND/OR the manufactured/fabricated product(s) is to be extracted, harvested, or recovered within 500 miles of the project site

E. Products that conform to the Environmental Objectives yet do not fully meet other requirements of this section may still be considered at the sole discretion of the Owner and Architect.

1.03 REFERENCES

A. American Society of Testing and Materials (ASTM)

C549 Specification for Perlite Loose Fill Insulation

C578 Specification for Rigid, Cellular Polystyrene Thermal Insulation

C665 Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing

C991 Specification for Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings

D4397 Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications

E84 Test Method for Surface Burning Characteristics of Building Materials

E119 Test Method for Fire Tests of Building Construction and Materials

E136 Test Method for Behavior of Material In A Vertical Tube Furnace At 750 Degrees C

B. Underwriter's Laboratories, Inc. (UL)

Fire Resistance Directory

1.04 DEFINITIONS

Thermal Resistivity (r-value): Temperature difference in degrees F (degrees C) between the two (2) surfaces of a material exactly one (1) inch (25 mm) thick, required to make one (1) BTU of energy flow through one (1) square foot (0.1 square meter) of the material in one (1) hour.

1.05 SUBMITTALS

A. Environmental Objectives Documentation: signed by the manufactures/fabricators stating level of compliance for the requirements and objectives in Environmental Objectives in this section.

B. General: Submit the following in accordance with conditions of Contract and Division 1, Section "Descriptive Submittals."

C. Manufacturer's Certifications: Submit manufacturer's representative certification that the proposed products comply with specified requirements, and are compatible with each other and substrates for the intended applications.

D. Product Data Sheet: Submit manufacturer's catalog data and application instructions for each material proposed for use.

1.06 QUALITY ASSURANCE

A. Environmental Protection Agency: Comprehensive Procurement Guildelines.

B. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements without delaying progress of the work.

C. Installer Qualifications: Engage an experienced installer, with not less than two (2) years experience and certification by the manufacturer as an approved installer, who has completed building insulation applications similar in material, design and extent to that indicated for projects that have resulted in construction with a record of successful in-service performance.

D. Fire-Test-Response Characteristics: Provide insulation and related materials with fire-test-response characteristics indicated on Contract documents, or specified elsewhere in this Section; to be determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface Burning Characteristics: ASTM E84.

2. Fire-Resistance Ratings: ASTM E119.

3. Combustion Characteristics: ASTM E136.

1.07 DELIVERY, STORAGE AND HANDLING

Deliver and store packaged materials in manufacturer's original unopened packaging fully labeled and intact until time of use. Store materials off ground and under cover to prevent damage or contamination to materials by water, foreign matter or other causes. Promptly remove from site any materials which show evidence of damage and immediately make all replacements necessary.

1.08 PROJECT CONDITIONS

Environmental Conditions: Do not proceed with installation of insulation under the following conditions:

A. When ambient and substrate temperature conditions are outside the limits permitted by insulation manufacturer.

B. When insulation is or is likely to become wet due to rain, frost, condensation or other causes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

Manufacturers: Subject to compliance with requirements, products by manufacturers that may be incorporated in the work include, but are not limited to the following. However, it is the Contractor's responsibility to provide only products compatible with the adjacent materials in the assembly.

A. Extruded Polystyrene Board Insulation

AFM Corporation

Amoco Foam Products Company

DiversiFoam Products

Dow Chemical Company

UC Industries, Inc.; Owens-Corning Fiberglass Corp.

Terraco Building Products

B. Glass-Fiber Blanket/Batt Insulation

CertainTeed Corp.

Knauf Fiberglass GmbH.

Owens-Corning Fiberglass Corp.

Schuller International, Inc., Manville

Thermafiber

C. Perlite Loose-Fill Insulation

Producer members of Perlite Institute, Inc.

D. Sprayed- Applied Cellulose

American Sprayed Fibers, Inc.

US Green Fiber, L.L.C.

ThermoCon, Inc.

2.02 PERIMETER AND UNDER-SLAB INSULATION

Extruded Polystyrene Board Insulation: Provide rigid water resistant, 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. Use a minimum 9% recycled content.

Surface Burning Characteristics: Maximum flame spread and smoke developed values of 5 and 175, respectively.

2.03 FRAME WALL AND CEILING INSULATION

A. Unfaced Mineral Fiber Blanket/Batt Insulation: Provide thermal insulation produced by combining mineral glass fibers with thermosetting resins to comply with ASTM C665, Type I (blankets without membrane facing). Use a minimum 20% post-consumer recycled content.

Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.

B. Faced Mineral Fiber Blanket/Batt Insulation

1. Kraft-Faced: Provide thermal insulation produced by combining mineral glass fibers with thermosetting resins to comply with ASTM C665, Type II, Class C (blankets with a non-reflective vapor-retarder membrane covering one principal face and not rated for flame propagation resistance - for use in non-exposed applications only). Use a minimum 20% post-consumer recycled content.

2. Foil-Scrim-Kraft: Provide thermal insulation produced by combining mineral glass fibers with thermosetting resins to comply with ASTM C665, Type III, Class A (blankets with a reflective vapor-retarder membrane facing with flame spread of 25 or less); with foil-scrim-kraft vapor-retarder membrane on one face. (Only allowed in concealed spaces of Types III, IV and V construction as defined by the **International** Building Code, and when facing is in substantial contact with the unexposed surface of the ceiling, floor or wall finish.) Use a minimum 20% post-consumer recycled content.

3. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.

C. Sound Attenuation Batts: Provide unfaced mineral fiber blanket/batt insulation where shown on Contract documents, to comply with requirements of ASTM C665, Type I, three (3) inches (76 mm) thick, unless indicated otherwise. Material shall be labeled as sound attenuation batts. Use a minimum 20% post-consumer recycled content.

D. **Wet-Spray Cellulose: Provide s**prayed material to meet all standards of performance according to ASTM 1149-90 Type I & II, self-supported, spray applied cellulosic thermal/acoustical insulation; contain a minimum 80% post-consumer recycled content; having been tested by Underwriter's Laboratories, Inc., U.L. 723, ASTM E84, having a Flame Spread of 10, Smoke Developed of 0; will bear U.L. reference #9408 label showing U.L. Follow-up service. Thermal Testing must be done in accordance with ASTM C518 and test results no older than 1985. Minimum R-Value 3.2 per inch; and

must be tested according to these other following ASTM tests standards: ASTM C 739 Cellulose fiber loose fill insulation, ASTM E 859 Air erosion of sprayed fire-resistive materials, ASTM E605 Thickness and density of sprayed fire-resistive materials, ASTM E736 Cohesion/adhesion of sprayed fire-resistive materials, ASTM C423 Sound absorption coefficients, ASTM E413 Classification for rating sound insulation, ASTM E90 Laboratory measurements of airborne sound transmission loss of building partitions ASTM E759 Effect of deflection of sprayed fire-resistive materials, ASTM C523 Light reflectance of acoustical material, ASTM E119 Fire test of building construction and materials, ASTM E 1042 Classification for acoustically absorbent materials.

2.04 PRE-ENGINEERED BUILDING INSULATION

Faced Mineral Fiber Blanket/Batt Insulation: Provide thermal insulation produced by combining mineral glass fibers with thermosetting resins to comply with ASTM C991, Type II, Class A (blankets with a reflective vapor-retarder membrane facing with flame spread of 25 or less); with vinyl-faced vapor-retarder membrane on one face. Use a minimum 20% post-consumer recycled content.

Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.

2.05 CAVITY WALL AND MASONRY-CELL INSULATION

Perlite Loose-Fill Insulation: Provide expanded perlite to comply with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or IV (surface treated for water repellency and limited moisture absorption), r-values of 3.3 - 2.8 for densities of 4.1 - 7.4 pcf at 75 degrees F (24 degrees C).

2.06 FIRE RETARDANT VAPOR RETARDERS

A Provide reinforced polyethylene fire retardant vapor retarders to comply with ASTM D4397 with a maximum permeance rating of 0.13 perms, with multiple layers of polyethylene film reinforced with layers of nylon cord reinforcing, and laminated together with a rubber adhesive to produce the following product in roll form:

1. Two (2) layers of polyethylene film and one (1) inner layer of nylon reinforcing, with a minimum overall thickness of 6.0 mils (0.15 mm).

2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.

2.07 MISCELLANEOUS MATERIALS

A. Adhesive for Bonding Insulation: Provide insulation manufacturer's recommended adhesives, capable of bonding insulation to substrates indicated without damaging or corroding either insulation or substrates. Meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168.

B. Mechanical Fasteners: Provide insulation manufacturer's recommended fasteners for required substrate and application.

C. Screens to be used with loose granular insulation: Provide suitable screens of stainless steel, properly sized and designed to permanently maintain drainage and ventilation openings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that conditions comply with requirements of Contract documents.

B. Verify that related work to be performed before installation of insulation within indicated spaces has been completed.

C. Verify that substrates are in satisfactory condition to receive insulation.

Masonry substrates: Verify that masonry materials have dried sufficiently and have attained optimum moisture content.

D. Do not proceed with installation of insulation until all unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removal of projections that might puncture vapor retarders, or interfere with insulation attachment.

B. Close off openings in cavities receiving poured-in-place insulation to prevent the escape of insulation. Provide screens where openings must be maintained for drainage or ventilation.

3.03 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's instructions applicable to products and application indicated. 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. Extend insulation full thickness as 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.

C. Do not install insulation which is damaged, wet, soiled, or which has been covered at any time with ice or snow.

D. Locate vapor retarders on the warm side of assembly, unless indicated otherwise on Contract documents or manufacturer's data sheets.

3.04 INSTALLATION OF PERIMETER AND UNDER-SLAB RIGID INSULATION

A. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions.

B. Protect below-grade insulation on vertical surfaces from damage during back-filling, by application of protection board. Set in adhesive in accordance with recommendations of insulation manufacturer.

C. Cut insulation neatly as required to fit tightly around obstructions.

D. Install boards as indicated:

1. Butt board edges and ends tightly.

2. Form solid joints where insulation boards meet protrusions and between adjacent boards.

3. Stagger joints.

3.05 INSTALLATION OF FRAME WALL AND CEILING INSULATION

A. Install per manufacturer's recommendations and installation sequence. Provide permanent placement and support of insulation.

B. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one (1) length is required to fill cavity, provide lengths that will produce snug fit at ends.

C. Cut installation neatly as required to fit tightly around obstructions.

D. Place insulation with facing oriented toward warm side of construction, unless otherwise indicated. Tape seal all penetrations in facing with manufacturer recommended tape.

E. Fasten insulation continuously tight against framing members to completely fill all spaces. Do not install on top or within 4 inches (102 mm) of recessed light fixtures.

F. Seal tight all joints and gaps, with tape to ensure airtight installation. Install in a manner to prevent sagging.

G. Provide metal clips or wire bracing for supplemental support of vertical heights over 10 feet (3 m).

H. Any insulation that does not fill the cavity width shall have support in the form of metal clips or wire bracing.

3.06 INSTALLATION OF CAVITY WALL AND MASONRY CELL INSULATION

A. Seal holes and openings in cavities as necessary to prevent loss of insulation during construction.

B. Install suitable screens inside cavities to maintain openings at drainage or ventilation openings.

C. Remove any obstructions which might interfere with free flow of insulation to intended spaces during pouring. Completely fill indicated cavities and spaces. Leave no gaps or voids.

D. During placement, do not allow insulation to fall a distance greater than one story, or 20 feet (6 m), whichever is less.

E. Rod insulation frequently during installation to eliminate formation of air pockets.

3.07 INSTALLATION OF VAPOR RETARDERS

A. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure vapor retarders to substrates with mechanical fasteners or adhesives as recommended by manufacturer. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping not less than two (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) o.c.

C. Seal overlapping joints in vapor retarders with adhesives or tape per vapor retarder manufacturer's printed directions. Seal butt joints and fastener penetrations with tape of type recommended by vapor retarder manufacturer. Locate all joints over framing members or other solid substrates.

D. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor retarder manufacturer.

E. Seal joints caused by pipes, conduits, electrical boxes and similar items penetrating vapor retarders with tape recommended by vapor retarder manufacturer to create an airtight seal between penetrating objects and vapor retarder.

F. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with tape or another layer of vapor retarder.

3.08 PROTECTION

General: Protect installed insulation and vapor retarder from damage due to harmful weather exposures and from construction damage. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.09 CLEANING

Remove all excess materials from the job site and leave the areas insulated ready for other trades.

END OF SECTION