UNIVERSITY OF SOUTHERN CALIFORNIA
HEALTH SCIENCES CAMPUS
NORRIS HEALTHCARE CENTER
LOS ANGELES, CALIFORNIA

SECTION 03 5216

LIGHTWEIGHT INSULATING CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cast-in-place cellular lightweight insulating concrete system and supplementary items necessary for installation.

1.2 ACTION SUBMITTALS

A. Product Data: Manufacturer's technical literature for each product and system indicated.

1. Include manufacturer's specifications for materials, construction details, and installation instructions.

B. Shop Drawings: Show details of fabrication and installation, including plans, elevations, sections, details of components, roof slopes, lightweight insulating concrete thicknesses, embedded insulation board, roof penetrations, roof perimeter terminations and curbs, control and expansion joints, roof drains, and attachments to other work.

C. Design Mixtures: For each lightweight insulating concrete mix.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Written reports based on evaluation of comprehensive tests performed by qualified testing agency indicating that each product complies with requirements.

B. Field Quality Control Reports: Written report of testing and inspection required by "Field Quality Control".

C. Manufacturer’s Project Acceptance Document: Certification by the manufacturer that its product(s) are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that a warranty will be issued.

D. Qualification Data:

1. For firms and persons specified in "Quality Assurance" to demonstrate their capabilities and experience. Include list of completed projects.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Experience: Installer's personnel with not less than 5 years of experience in the successful performance of Work similar to scope of this Project.

2. Supervision: Installer shall maintain a competent supervisor at Project while the Work is in progress, and who has not less than 5 years of experience installing products and systems similar to scope of this Project.
3. Manufacturer Acceptance: Installer shall be certified, approved, licensed, or acceptable to manufacturer to install products.

B. Fire-Resistance Ratings: Where indicated, provide lightweight insulating concrete system identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

1.5 PRE-INSTALLATION CONFERENCE

A. Pre-Installation Conference: Before Work begins, conduct conference at Project site.

1. Participants:

a. Architect.
b. Contractor, including superintendent.
c. Installer, including project manager and supervisor.
d. If requested, Manufacturer's qualified technical representative.
e. Installers of other construction interfaced with Work.

2. Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited to, following topics:

a. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
b. Review Contract Document requirements.
c. Review approved submittals.
d. Review inspection and testing requirements.
e. Review environmental conditions and procedures for coping with unfavorable conditions.
f. Resolve deviations or differences between Contract Documents and the manufacturer's specifications.

3. Record discussions, including decisions and agreements, and prepare report.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original undamaged packages or acceptable bulk containers.

B. Store packaged materials to protect them from elements or physical damage.

C. Do not use cementitious products that show indications of moisture damage, caking, or other deterioration.

1.7 PROJECT CONDITIONS

A. Ambient Conditions: Install lightweight insulating concrete system within range of ambient and substrate temperatures and moisture conditions as recommended by manufacturer. Protect substrates from environmental conditions that affect performance. Do not apply to a damp or wet substrate or during high humidity conditions including snow, rain, fog, or mist.

1.8 COORDINATION

A. Coordinate installation of products and systems with interfacing and adjoining construction to provide a successful installation without failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers listed below. If not listed, submit as substitution according to Conditions of the Contract and Division 01 Section "Substitution Procedures".

2.2 MATERIALS, GENERAL

A. Single Source Responsibility: Furnish each type of product from single manufacturer. Provide secondary materials only as recommended by manufacturer of primary materials.

2.3 PERFORMANCE REQUIREMENTS

A. General Performance: Engineer products and systems to withstand loads within limits of allowable working stresses of the materials involved under conditions indicated and without permanent deformation or failure of materials.

B. Design Loads: Engineer to withstand design loads including, but not limited to, gravity, wind, seismic, and erection design loads and thermal movements established by authorities having jurisdiction, applicable local building codes and as indicated.

1. Structural Movement: Engineer to withstand movements of structure including, but not limited to, drift, twist, column shortening, long-term creep and deflection from uniformly distributed and concentrated live loads. Contractor shall obtain required design data and identify movements accommodated on submittal drawings.

C. Material Compatibility: Provide lightweight insulating concrete system materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

D. FMG Approvals Listing: Provide lightweight insulating concrete system and component materials evaluated by FMG Approvals as part of a roofing assembly and listed in FMG Approval's "RoofNav" for Class 1 or noncombustible construction, as applicable.

2.4 CELLULAR LIGHTWEIGHT INSULATING CONCRETE SYSTEM MATERIALS

A. Cementitious Material: Portland cement, ASTM C 150, Type I, Type II, or Type III.

B. Foaming Agent: ASTM C 869.

C. Water: Clean, potable.

D. Joint Filler: ASTM C 612, Class 2, glass-fiber type; compressing to one-half thickness under a load of 25 psi (172 kPa).

E. Molded-Polystyrene Insulation Board: ASTM C 578, Type I, 0.90 lb/cu. ft. (14.4 kg/cu. m) minimum density.

1. Provide units with manufacturer's standard keying slots or holes of approximately 3 percent of board's gross surface area.

2.5 DESIGN MIXTURES

A. Prepare design mixtures for each type and strength of lightweight insulating concrete by laboratory trial batch method or by field-test data method. For trial batch method, use a qualified independent testing agency for preparing and reporting proposed mixture designs.

B. Limit water-soluble chloride ions to the maximum percentage by weight of cement or cementitious material permitted by ACI 301 / 301M.

2.6 CELLULAR LIGHTWEIGHT INSULATING CONCRETE SYSTEM

A. Produce cellular lightweight insulating concrete system with the following minimum physical properties using cementitious materials, air-producing liquid-foaming agents, and the minimum amount of water necessary to produce a workable mix.

1. Manufacturers:

a. Celcore Incorporated.
b. Cellular Concrete LLC, Mearlcrete Division.
c. Elastizell Corporation of America.
d. Siplast.

2. As-Cast Unit Weight: 34 to 48 lb/cu. ft. (545 to 769 kg/cu. m) at point of placement, when tested according to ASTM C 138 / C 138M.
3. Oven-Dry Unit Weight: 26 to 36 lb/cu. ft. (416 to 577 kg/cu. m), when tested according to ASTM C 495.
4. Compressive Strength: Minimum 200 psi (1380 kPa), when tested according to ASTM C 495.
5. R-Value: Minimum average thickness as required to obtain an average R-value as indicated on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 INSTALLATION, GENERAL

A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:

1. Respective manufacturer's written installation instructions.
2. Accepted submittals.
3. Contract Documents.

3.3 PREPARATION

A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

3.4 LIGHTWEIGHT INSULATING CONCRETE INSTALLATION

A. Control Joints: Install control joints at perimeter of roof deck and at junctures with vertical surfaces, including curbs, walls, and vents, for full depth of lightweight insulating concrete. Fill control joints with joint filler.

1. Provide 1 in (25 mm) wide control joints for roof dimensions up to 100 ft (30 m) in length; 1-1/2 in (38 mm) wide control joints for roof dimensions exceeding 100 ft (30 m).

3.5 MIXING AND PLACING

A. Mix and place lightweight insulating concrete system according to manufacturer's written instructions, using equipment and procedures to avoid segregation of mixture and loss of air content.

B. Install insulation board according to lightweight insulating concrete system manufacturer's written instructions. Place insulation board in wet lightweight insulating concrete slurry poured a minimum of 1/8 in (3 mm) over the structural substrate. Ensure full contact of insulation board with slurry. Stagger joints and tightly butt insulation boards.

1. Install insulation board in a stair-step configuration with a maximum step-down of 1 in (25 mm).

C. Deposit and screed lightweight insulating concrete in a continuous operation until an entire panel or section of roof area is completed. Do not vibrate or work mix except for screeding or floating. Place to thicknesses as necessary for insulating system specified R-value and slopes indicated on the Drawings.

D. Finish top surface smooth, free of ridges and depressions, and maintain surface in condition to receive subsequent roofing system.

E. Begin curing operations immediately after placement and air cure for not less than three days, according to manufacturer's written instructions.

F. If ambient temperature falls below 32 deg F (0 deg C), protect lightweight insulating concrete from freezing and maintain temperature recommended by manufacturer for 72 hours after placement.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Manufacturer's qualified technical representative shall periodically inspect Work to ensure installation is proceeding in accordance with manufacturer's designs, recommendations, instructions, and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.

1. Manufacturer's Technical Representative Qualifications: Direct employee of technical services department of manufacturer with experience in providing recommendations, observations, evaluations, and problem diagnostics.

B. Testing of samples of lightweight insulating concrete system obtained according to ASTM C 172, except as modified by ASTM C 495, shall be performed according to the following requirements:

1. Determine as-cast unit weight during each hour of placement, according to ASTM C 138 / C 138M.
2. Determine oven-dry unit weight and compressive strength according to ASTM C 495. Make a set of at least six molds for each day's placement, but not less than one set of molds for each 5000 sf (465 sq. m) of roof area.
3. Perform additional tests when test results indicate that as-cast unit weight, oven-dry unit weight, compressive strength, or other requirements have not been met.

    a. Retest cast-in-place lightweight insulating concrete system for oven-dry unit weight and compressive strength.

C. Owner's Testing Agency Field Service: The Owner may employ and pay a qualified independent testing agency to perform field quality control. Materials and installations failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at Contractor’s expense.

3.7 DEFECTIVE WORK

A. Refinish, or remove and replace lightweight insulating concrete system if surfaces are excessively scaled or too rough to receive roofing according to roofing membrane manufacturer's written instructions.

B. Remove and replace lightweight insulating concrete that fails to comply with requirements.

END OF SECTION