®	SECTION 03522
	CELLULAR INSULATING CONCRETE ROOF DECK

PART 1: GENERAL

1.01 SECTION INCLUDES:

Note to Specifier: List below generic types of products, work or requirements specified in this Section. Do not include procedure, process, or preparatory work. Do not "scope" the Section or imply a trade responsibility.

A. Cellular lightweight insulating concrete roof deck.

Note to Specifier: Include insulation board, metal decking and reinforcing mesh if specified in Part 2: Products.

B. [Insulation Board.]

C. [Metal Decking.]

D. [Reinforcing Mesh.]

1.02 RELATED SECTIONS:

Note to Specifier: List Sections with specific requirements pertaining to this work. References may include a system interface with other systems.

A. Section 0300 - Cast-in-place Concrete: Structural roof deck.

Note to Specifier: Delete the following Section when metal decking is specified as part of this Section.

B. Section 05300 - Metal Decking: Steel roof deck and accessories.

C. Section 06100 - Rough Carpentry: Wood blocking, curbs.

Note to Specifier: Delete the following Section when insulation is specified as part of this Section.

D. Section 07220 - Roof and deck insulation.

Note to Specifier: Coordinate the Section Number for the following with the roofing specification used on each project.

E. Section 07500 - Membrane Roofing.

F. Section 07600 - Flashing and Sheet Metal.

1.03 **REFERENCES:**

Note to Specifier: Include reference standards that are to be indicated within the text of this Section. Edit the following as required for the particular project.

A. AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM).

Note to Specifier: Include 1.03.A.1 if corrugated steel form units are used as a substrate for roof assembly.

1. ASTM A525 - Steel Sheet Zinc Coated (Galvanized) by Hot Dip Process.

2. ASTM C150 - Portland Cement

3. ASTM C495 - Compressive Strength of Lightweight Insulating Concrete.

4. ASTM C796 - Foaming Agents For Use in Producing Cellular Concrete Using Preformed Foam.

5. ASTM C869 - Foaming Agents Used in Making Preformed Foam for Cellular Concrete.

B. FACTORY MUTUAL (FM):

1. Roof Assembly Classifications.

Note to Specifier: Select the applicable code based upon the location of the project.

C. [South Florida Building Code (SFBC), {Broward} {Dade} County Edition.]

D. [Southern Standard Building Code, {Palm Beach} County Edition.]

E. Steel Deck Institute (SDI):

1. Diaphragm Design Manual, Second Edition.

F. Underwriters Laboratories (UL):

1. Fire Resistance Classifications.

1.04 **PHYSICAL PROPERTIES:**

Note to Specifier: Select the appropriate values below.

A. Minimum Oven Dry Density: [25] [ ] pcf. [400] [ ] kg/m3.

B. Minimum Compressive Strength: [200] [ ] psi. [1.38] [ ] mPa.

C. Wet Density at Point of Placement: [36] [ ] pcf +/- 5. [576] [ ] kg/m3 +/- 2.25 kg/m3.

D. Thermal Conductivity ("k" Value): [.45 at 25 pcf.] [___at ___ pcf.]. [.45 at 400kg/m3] [___at ___ kg/m3].

1.05 **SUBMITTALS:**

Note to Specifier: List data to be furnished by contractor prior to construction such as shop drawings, product data, samples, design data, manufacturer's instructions, and manufacturer's certificates that products meet or exceed this specification.

A. Submit [shop drawings] [and] [product data] under provisions of Section [01300.] [01340.]

B. Indicate roof plan, layout of roof-mounted equipment, slopes and adjoining surfaces.

C. Submit product data for cellular concrete, insulation board [.] [,] and metal deck.

D. Submit design data under provisions of Section 01340.

Note to Specifier: Delete Paragraph 1.05.E. when project is outside area of South Florida Building Code.

E. Submit manufacturer's current Miami-Dade County Product Control Notice of Product Acceptance (NOA). The NOA shall indicate, as a minimum, the date of expiration of the approval and the specific conditions governing the approval.

F. Submit test reports under the provisions of Section [01400.] [01405].

G. Submit test reports indicating that the cellular insulating concrete physical properties for compressive strength and density meeting specification requirements.

H. Submit manufacturer's certificate; under provisions of Section [01400] [01405] that products meet or exceed [specified requirements.] [_____.]

Note to Specifier: When manufacturer's instructions for specific installation requirements are utilized, ensure that statements in Part 3: Execution agree with those instructions.

I. Submit manufacturer's installation instructions under provisions of Section [01300.] [01340.]

1.06 **QUALIFICATIONS:**

A. Foam concentrate: The foam concentrate used to produce the cellular lightweight insulating concrete must have a trouble free history of at least five years with acceptable documentation of UL, FM.

B. Applicator: Company specializing in application of cellular lightweight insulating concrete [with minimum { } years {documented} experience and approved by the manufacturer.]

1.07 **REGULATORY REQUIREMENTS:**

A. Conform to [applicable] [South Florida Building] code for roof assembly fire hazard requirements.

B. Fire Resistance Classification: UL Classified [Floor-] [Roof-] Topping Mixture Fire Resistance Classification Design Nos. [____] in accordance with UL Fire Resistance Index.

Note to Specifier: For metal roof deck applications, identify whether the FM classification is to be I-60, I-90, I-120, I-150 or 1-180.

C. Roof Assembly Classification: FM Class [I-60] [I-90] [I-120] [I-150] [I-180] construction, in accordance with FM Construction Bulletin 1-28.

D. Provide certification of inspection confirming approval of [by] [authority have jurisdiction].

1.08 DELIVERY, STORAGE AND HANDLING:

A. Deliver products to site under provisions of Section [01600.] [01620.]

B. Deliver products in manufacturer's original undamaged containers or acceptable bulk handling.

C. Store and protect products under provisions of Section [01600.] [01620.]

D. Store packaged products off ground in manner to protect them from elements, especially moisture damage.

E. Remove products from site that show indication of moisture damage, caking, or other signs of deterioration and replace with undamaged materials.

1.09 ENVIRONMENTAL REQUIREMENTS:

A. Avoid installation of cellular lightweight insulating concrete when outside temperatures will be below 40ºF. [4.5 C].

B. When it is anticipated that outside temperatures will be below 40ºF [4.5 C] 24 hours after placing concrete, heat mixing water to maximum of 120ºF. [49 C].

PART 2: PRODUCTS

2.01 MATERIALS:

A. Insulating Concrete:

1. Foaming Agent: Celcore Foam Concentrate for Concrete produced by Celcore Incorporated, 3148 US Highway 70 West,

Black Mountain, North Carolina 28711 (828) 669-4875.

2. Portland Cement meeting ASTM C 150, unless otherwise approved.

3. Water: Clean, fresh, and free from injurious quantities of acid, alkali, salt, oil, organic matter, or other impurities.

4. Admixtures: Do not use admixtures without the approval of the insulating concrete manufacturer; use approved admixtures in strict accordance with manufacturer's recommendations.

Note to Specifier: Coordinate inclusion of the following with Paragraphs 1.01 and 1.02. Include insulation board if required for project.

B. Insulation Board: Foam plastic (polystyrene), with a minimum of (1) pcf [16 kg/m3] density; fabricate board with (8) 2-1/2 inch +/- 1/2 inch [6.35 cm +/- 1.27 cm] diameter holes to provide a positive keying action; Factory Mutual (FM) and UL approved.

Note to Specifier: Coordinate inclusion of the following with paragraphs, 1.01 and 1.02. Include metal decking if appropriate for project. Specify gage and size as recommended by deck manufacturer to support required live and dead loads and to comply with applicable Building Codes.

C. Metal Deck: ASTM A525, G60 minimum galvanized coating; minimum [26] [ ] gage, corrugated sheet steel; [15/16"] [ ] [2.38 cm] [ ] depth, [ ] wide sheets.

Note to Specifier: Include the following when required for fire or insurance ratings.

2.02 **MIXES:**

A. Mix materials in accordance with recommendations of manufacturer

to yield the specified physical properties.

B. Mix and pump cellular lightweight insulating concrete into place using a mixing plant approved by the manufacturer. Thoroughly blend all materials before discharging the mixer.

C. Maintain a wet density of 36 pcf +/- 5 pcf [576 kg/m3 +/- 2.25 kg/m3] at place of deposit.

D. Maintain a consistency suitable to provide a plastic mix capable of being screeded to a smooth finish.

PART 3: EXECUTION

3.01 EXAMINATION:

Note to Specifier: Include Paragraph 3.01.A. below if installed over structural concrete.

A. Verify that top surface of structural concrete scheduled to receive insulating concrete is free of any materials or coverings that may prevent bond.

Note to Specifier: Include Paragraph 3.01, A. below if installed over metal deck.

A. Examine surfaces for inadequate anchorage, foreign material, moisture, and unevenness which would prevent proper application of insulating concrete.

B. Beginning of installation means applicator accepts existing [surface] [substrate] conditions.

3.02 PREPARATION:

A. Cover roof deck penetrations, drains, etc. before installing insulating

concrete.

B. Clean [surfaces] [substrate] of deleterious material and water.

C. Set screeds to assure insulating concrete is applied to the required depth.

D. Protect elements surrounding the work of this Section from damage or disfiguration.

3.03 **INSTALLATION:**

Note to Specifier: Include Paragraph 3.03.A. if metal deck is used for substrate.

A. Install metal deck in accordance with Plans, Specifications, and/or applicable codes.

Note to Specifier: Include Paragraphs 3.03 B, C and D where insulation board is used. Where insulation board is not used, include Paragraph 3.03 E.

B. Place cellular concrete slurry to a minimum thickness of 1/8 inch [.32 cm] over top of corrugations or substrate.

C. The insulation board shall be placed in such a manner as to cause full contact of the board surface with the plastic cellular concrete. Cellular concrete shall enter into the keying holes of the board. The insulation board shall be placed in a brick-like pattern of staggered joints butted tightly together.

D. Place cellular concrete on top of the insulation board to a minimum thickness of two (2) inches [5.08 cm].

E. Place cellular concrete to minimum thickness of two (2) inches [5.08 cm] over top of corrugations or substrate.

Note to Specifier: Include Paragraph 3.03.F. where wire fabric is used.

F. Wire Fabric:

1. Install with minimum end lay of six (6) inches [15.24 cm] with sides lapped minimum two (2) inches [5.08 cm], or tied.

2. Cut to fit at walls, curbs and openings in the roof decking.

3. Do not run fabric through expansion joints.

3.04 FIELD QUALITY CONTROL:

A. Field [inspection] [and] [testing] will be performed under the provisions of Section [01400.] [01410.]

B. Test insulating concrete in accordance with ASTM C495 as modified below:

1. During molding, place the concrete in two (2) approximately equal layers. Raise and drop the cylinders approximately one (1) inch [2.5 cm] three (3) times on a hard surface after placing each layer. Do not rod the concrete.

2. Keep concrete in molds for a minimum of seven (7) days.

3.05 PROTECTION:

A. Apply a curing membrane [Celcore PVA Curing Compound] [ ] over deck surface as soon as the deck will support foot traffic for protection against excessive evaporation or dry out. This PVA membrane shall be an integral part of the deck system. Prevent excess roof traffic for 24 hours.

END OF SECTION