

PERLITE INSULATING CONCRETE ROOF DECK

PART 1—GENERAL

1.01 WORK INCLUDED

- A. Perlite insulating concrete roof deck.
 - a. Include 1.01.B if insulation board is specified.
- B. Insulation board.

1.02 RELATED WORK

- A. Section 03300: Cast-In-Place Concrete
- B. Section 05300: Metal Decking
- C. Section 07212: Rigid Insulation
- D. Section 07500: Membrane Roofing
- E. Section 07600: Flashing and Sheet Metal

1.03 QUALITY ASSURANCE

- A. Manufacturers Qualifications:
 - a. Perlite aggregate produced by manufacturer regularly engaged in production of heat expanded aggregate.

Include 1.03.A.2 when mix is to be provided by qualified ready-mix plant

- b. Perlite Insulating Concrete: Product of acceptable concrete supplier regularly engaged production of lightweight insulating concrete.
- B. Applicator Qualifications
 - a. Insulating concrete placed by contractor regularly engaged in application of lightweight insulating concrete roof decks.

Delete 1.03.B.2 except for work to be performed in cold weather.

- b. Experienced in cold weather techniques required for placing perlite insulating concrete.
- C. Methods of Test
 - a. Compressive strength of insulating concrete: ANSI/ ASTM C 495
 - b. Oven dry density of Perlite concrete: ANSI/ ASTM C 495
 - c. Wet density of Perlite concrete: ANSI/ ASTM C 138

1.04 REGULATORY REQUIREMENTS

- A. Conform to local building code
 - i. Specify special code authority having jurisdiction over perlite insulating concrete roof deck and its installation.

1.05 REFERENCES

- A. ANSI/ASTM C 150- Portland Cement
- B. ANSI/ASTM A 185- Welded Steel Wire Fabric for Concrete Reinforcement
- C. ANSI/ASTM C 332- Lightweight Aggregates for Insulating Concrete

Include 1.05.D if corrugated steel form units are used as substrate for roof deck assembly.

- D. ANSI/ASTM A 525- Steel Sheet Zinc Coated (Galvanized) by Hot Dip Process.

1.06 SUBMITTALS

- A. Submit test reports stating that insulating concrete physical properties meet specification requirements.
- B. Submit copies of metal deck manufacturer's installation recommendations.

Include the following Article if ready-mix materials are to be used.

1.07 PRODUCT DELIVERY

- A. Deliver mixed Perlite insulating concrete materials to project site in quantities permitting immediate placement.
- B. Do not rotate drums during transit
- C. Upon arrival at site, mix materials for approximately five minutes

Include the following Article if materials will be site-mixed only.

OR

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original undamaged packages or acceptable bulk handling equipment.
- B. Store packaged materials off ground in manner to protect them from elements, especially moisture damage.
- C. Remove cement from project site that shows indication of moisture damage, caking, or other signs of deterioration and replace with undamaged materials.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. All concrete materials, reinforcement, and forms with which Perlite concrete may come in contact shall be free of frost.
- B. No frozen material or materials containing ice shall be used.
- C. When it is anticipated that outside temperatures will be below 40 degrees F (4 degrees C) 24 hours after placing concrete, mixing water shall be heated to maximum of 120 degrees F (48 degrees C).

Include 1.08.D under severe winter conditions to allow for proper curing.

- D. Extreme Dry Weather Curing: Sprinkle insulating concrete with water for three days to allow hydration of cement and to minimize shrinkage cracking.

PART 2—PRODUCTS

2.01 MATERIALS

- A. Portland Cement: ASTM C150, (Type I) (Type II) (Type III).

Use of Type III is recommended during cold weather conditions.

- B. Perlite Aggregate: ASTM C332, Group I.
- C. Water: Clean and free from deleterious substances.
- D. Air Entraining Admixtures: As recommended by aggregate manufacturers.
- E. Insulation Board: Foam plastic (Polystyrene), with a minimum 1 pcf (16 kg/m³) density. Board shall include venting holes which approximate 3 percent of gross board area.
- F. Metal Deck: ANSI/ASTM A525, G60 minimum coating; minimum () gage, corrugated sheet steel; () inch () mm high, () inch () mm wide sheets; lapped edges (vent clips) (deformed ends), and uniformly distributed slots for ventilation of insulating concrete.

- G. Control Joint Filler: Glass fiber, compressible to 1/2 original thickness under load of 25 psi (172k Pa).

Use unwelded wire fabric when required for fire or insurance ratings.

- H. Unwelded Wire Fabric: Keydeck style 2160-2-1619, galvanized.

2.02 INSULATING CONCRETE PHYSICAL PROPERTIES

- A. Maximum Oven Dry Density: (___) pcf. (___) kg/m³
 B. Minimum Compressive Strength: (___) psi. (___) kPa.
 C. Wet Density at Point of Placement: (___) pcf. (___) kg/m³

Select properties from following table:

Cement/ Aggregate Ratio by Volume	Oven Dry Density		Dry Density Range		Compressive Strength Range		Minimum Compressive Strength		Wet Density When Placed	
	lbs/ft ³	kg/m ³	lbs/ft ³	kg/m ³	lbs/in ²	kPa	lbs/in ²	kPa	lbs/ft ³	kg/m ³
1:4	36.0	576	34.0-40.0	544-640	350-500	2413-3447	350	2413	50.5 ± 2.0	808.0 ± 32.0
1:5	30.5	488	28.0-34.0	448-544	230-340	1585-2344	230	1585	45.5 ± 2.0	728.0 ± 32.0
1:6	27.0	432	24.0-28.0	384-448	140-200	965-1378	140	965	40.5 ± 2.0	648.0 ± 32.0
1:8	22.0	352	20.0-24.0	320-384	80-125	552-861	80	552	36.5 ± 2.0	584.0 ± 32.0

PART 3—EXECUTION

3.01 INSPECTION

Include 3.01.A below if material is installed over structural concrete.

- A. Examine top surface of structural concrete scheduled to receive insulating concrete to assure that it has not been treated or sealed.

—OR—

Include 3.01.A below, if material is installed over metal deck.

- A. Examine surfaces for inadequate anchorage, foreign material, moisture, and unevenness which would prevent execution and quality of application of roof deck system as specified.
 B. Do not proceed with application of the system until defects are corrected.

3.02 PREPARATION

Delete 3.02.A when Perlite insulating concrete roof deck is designed as a diaphragm to resist horizontal forces and is installed over metal deck.

- A. Layout control joint locations before starting placement of materials
 B. Set screeds to assure insulating concrete depth is minimum of 2 inches (50 mm).
 C. Cover drains before installing insulating concrete.

Include 3.02.D if insulation board is used.

- D. Schedule work to assure placement of insulating concrete before slurry has set.

3.03 INSTALLATION

Include if metal deck is used for substrate. Specify gage and size as recommended by deck manufacturer to support required live and dead loads.

- A. Metal Deck: Install in accordance with metal deck manufacturer's recommendations.
- B. Place insulating concrete slurry approximately to 1/8 inch (3.2 mm) thickness over substrate,
- C. Install insulation board in slurry butting board edges, with end joints staggered.
- D. Wire Fabric:
 - a. Install with minimum end lap of 6 inches (150 mm) with sides lapped minimum of 2 inches (50 mm), or tied.
 - b. Cut to fit at walls, curbs and openings.
 - c. Do not run fabric through control joints.
 - d. Insulating Concrete:
 - i. During placement, exercise care to avoid segregation of materials and convey from mixer to place of deposit by methods that will produce specified physical properties at points of placement.

Delete 3.03.E.2 when Perlite insulating concrete roof deck is designed as a diaphragm to resist horizontal forces and is installed over metal deck.

- ii. Provide minimum 1 inch (25 mm) wide control joint through thickness of insulating concrete at building expansion joints in structural roof deck, root projections. and parapet walls. Use minimum 1.1/2 inches (38 mm) wide control joint for roof areas over 100 feet in length.
 - iii. Place insulating concrete to required depths.
 - iv. Do not tamp or vibrate insulating concrete.
 - v. Screed or float to even surface suitable for application of roofing.
- E. Curing:
 - a. Air cure minimum of three days.
 - b. Protect concrete from damage due to impact, overloading or marring of surfaces during curing period.

3.04 FIELD QUALITY CONTROL

- A. Perform wet density samplings conforming to ASTM C 138.
- B. Adjust mixture and mixing procedures according to field sampling information.

3.05 PROTECTION

- A. Cure for a minimum of three days prior to allowing surface traffic; or before proceeding with roof application.



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