

Specification for Geofill LD

Low Density Cellular Concrete (LDCC)

For Load Reducing Fills

I – SCOPE OF WORK

Work shall include all labor, materials, and equipment to furnish and install Geofill LD, a non-pervious, Low Density Cellular Concrete (LDCC) at the location shown in the plans in accordance with the details in the plans and this specification.

II – MATERIALS

- A. Portland cement shall comply with ASTM C150 (Type I, II, or III).
- B. Fly ash shall be Class C or Class F and compatible with foaming agent.
- C. Water shall be free from deleterious substances.
- D. Foam shall be Geofill Concentrate (Phone #888-820-3455) conforming to ASTM C796.
- E. Admixtures for water reducing, retarding, accelerating, anti-washout and other specific properties may be used when specifically approved by the manufacturer of the preformed foam.
- F. Geofill LD shall meet properties of classification indicated on drawings:
(Each project should be analyzed to determine the appropriate product class, which should be reflected on the drawings.)

Classification	II	III	IV
Ranged Cast Density, PCF	26-30	30-36	36-42
Minimum Compressive Strength, PSI	40	80	120
Freeze-Thaw Resistance, Cycles	330	-	330
Relative E not less than 70% per ASTM C666, modified			
Shear Modulus, G, PSI per ASTM D4015 at confining stress of 3 PSI	27,670	41,800	50,260
Young's Modulus, E, PSI based on Poisson's Ratio $u=0.22$ and $E=2G(1+u)$	67,500	101,900	122,635
% Water Absorption, after 120 days, maximum	20	16	14
Coefficient of Permeability, k cm/sec., per ASTM D2434			
Confining stress, 2.5 PSI	4.7x10 ⁻⁵		1.5x10 ⁻⁶
Confining stress, 18 PSI	1.9x10 ⁻⁵		5.4x10 ⁻⁷

III – SUBMITTALS

- A. Mix design for LDCC, including materials to be used and their sources.
- B. Resume of contractor showing experience as specified below, including qualifications of contractor's superintendent and / or foreman.
- C. Description of equipment and placement methods to verify compliance with specifications.

IV – PRODUCTION

- A. Foam generating equipment shall be used to produce a predetermined quantity of pre-formed foam which shall be mixed and blended with cementitious slurry. Equipment shall be calibrated to produce consistent foam with stable, uniform cellular structure.
- B. When producing neat cellular concrete (no sand or other aggregates), pre-formed foam under no circumstances shall be added or blended with cementitious slurry in a transit mixer.
- C. LDCC shall be produced utilizing specialized automated proportioning, mixing, and foam producing equipment, which is capable of meeting the specified properties.
- D. Avoid excessive handling of the material. After sufficient mixing of the foam with slurry, LDCC shall be conveyed promptly in its final location.
- E. All equipment used must be approved by foam manufacturer.

V – INSTALLATION

- A. Prior to placement of LDCC, the ground surface shall be excavated to the lines and grades shown on the plans.
- B. There shall be no standing water in the area to be filled. If necessary, dewatering shall be continuous during placement of materials.
- C. Any items to be encased in LDCC shall be set in place and secured prior to installation of material.
- D. Placement shall not be allowed on frozen ground.
- E. Place LDCC in such a manner so that minimal consolidation of material occurs during or after placement. Placement of LDCC shall not exceed depths as recommended by the manufacturer.
- F. Final surface of LDCC shall be within +/- 0.2 feet of the plan elevations.
- G. LDCC shall not be vibrated or disturbed. Vehicles, equipment, backfills or other loadings on the fill material shall not be permitted until the material has attained an adequate compressive strength.

VI – QUALITY CONTROL AND QUALITY ASSURANCE

- A. Contractor shall have a record of experience and quality of work placing LDCC that is satisfactory to the Engineer including the following:
 - 1. Shall be capable of developing a mix design, batching, mixing, handling, and placing of LDCC.

2. Shall be regularly engaged in the production and placement of LDCC for engineered fills.
3. Shall have satisfactory completed during the last three (3) years at least five (5) LDCC projects with no less than 2,000 cubic yards each and must have also completed at least two (2) LDCC projects of no less than 5000 cubic yards.
4. Workers, including the contractor's superintendent and/or foreman, shall be fully qualified to perform the work and have had previous experience in production and placement of LDCC under similar conditions.

B. TESTING

1. Testing to be performed by the OWNER or approved agency.
2. A minimum of four (4) 3"x 6" cylinders shall be molded for each 500 cubic yards placed.
3. LDCC may be tested at any age (after 3 days) for compressive strength in accordance with ASTM C-495. At least two (2) specimens from each set should be tested at 28 days unless otherwise approved by engineer.
4. Contractor shall record and measure wet cast densities at the point of placement hourly. Mix shall be adjusted as required to obtain the specified cast density at the point of placement.

VII – MEASUREMENT AND PAYMENT

- A. Geofill LD shall be paid for at the contract unit price per cubic yard for materials produced.
- B. When the project is constructed essentially to the lines, grades or dimensions shown on the plans and the contractor and owner have agreed in writing that the plan quantities are accurate, no further measurement shall be required and payment will be for the quantities shown in the contract for LDCC; however, if errors are discovered after work has been started, an appropriate adjustment will be made.
- C. When the plans have been altered, accurate survey information is not available prior to placement, or when disagreement exists between the contractor and owner as to the accuracy of the plan quantities, either party shall, before work is started, have the right to request in writing that LDCC be measured based on materials produced on site.