



Guide Specifications for Lightweight Geotechnical Applications

Aggregate

Lightweight aggregate shall be Expanded Shale produced by the rotary kiln process and meeting the requirements of ASTM C 330. Lightweight aggregate shall have a proven record of durability, and be non-corrosive, with the following properties:

Aggregate Physical Properties

- A1 Soundness Loss:** The maximum soundness loss shall be 15% when tested, with 4 cycles of magnesium sulfate, in accordance with AASHTO T 104.
- A2 Abrasion Resistance:** The maximum abrasion loss shall be 30% when tested in accordance with ASTM C 131.
- A3 Chloride Content:** The maximum chloride content shall be 100 ppm when tested in accordance with AASHTO T 291.
- A4 Grading:** Aggregate grading to be 3/4" to No. 4 or 3/8" to No. 8 when tested in accordance with ASTM 136.

Project Performance Specification

B1 In-place unit weight (bulk density): The maximum in-place compacted moist density shall be 65lbs/ft³ when measured by one point proctor test conducted in accordance with a modified version of ASTM D 698 "Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort". Because of the cohesionless nature of coarse lightweight aggregate, the standard shall be modified as follows: The aggregate sample shall be placed in a 0.5 cubic foot bucket at the moisture content that the aggregate will be delivered to the jobsite. The sample shall be placed in three equal layers and compacted by dropping a 5.5 pound rammer from a distance of 12 inches 25 times on each layer.

B2 Stability (Phi angle, ϕ): The minimum angle of internal friction ϕ shall be 45 degrees when tested in accordance with the method specified by the engineer.

Construction

C1 Method of Construction: Lightweight fill shall be placed in uniform layers. When required by the engineer, each layer shall be compacted using vibratory compaction equipment weighing not more than 12 tons static weight. The actual lift thickness, exact number of passes, and need for vibrating the roller will be determined by the engineer, depending on the project requirements (i.e., stability, compaction, unit weight) and equipment used. In confined areas vibratory plate compaction equipment shall be used (5 hp to 20 hp) with a minimum of two passes in 6" lifts for a 5 hp plate and 12" lifts for a 20 hp plate. The contractor shall take all necessary precautions when working adjacent to the lightweight fill to ensure that the material is not over compacted. Construction equipment, other than for placement and compaction, shall not operate on the exposed lightweight fill.

C2 Aggregate loose unit weight (bulk density): the maximum aggregate 24-hour soak SSD loose unit weight (bulk density) shall be 55 lbs/ft³ when tested in accordance with ASTM C 29.

