

Special Specification 4044

Permeable Concrete Structural Backfill



1. DESCRIPTION

Furnish a permeable concrete mix designed of clean stone, cement, and water for placement behind retaining walls.

2. MATERIALS

Provide concrete materials conforming to the material requirements listed in Item 421, Hydraulic Cement Concrete and in accordance with the requirements of the following Item.

Provide permeable concrete designed to meet an average compressive strength of 2000 psi at 28 days.

- 2.1. **Coarse Aggregate.** Unless otherwise allowed by the Engineer, provide coarse aggregates meeting the gradations of Table 1.

Table 1
Mix Design Requirements

Aggregate Grade No. ¹	Nominal Size	Percent Passing on Each Sieve						
		1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8
5 (67)	3/4"		100	90-100		20-55	0-10	0-5
6 (7)	1/2"			100	90-100	40-70	0-15	0-5

1. Corresponding ASTM C 33 gradations shown in parentheses.

- 2.2. **Admixtures.** Admixtures not covered under DMS 4640 or with no standard designation may be used only when allowed by the Engineer when its use for specified properties is required.
- 2.3. **Curing Materials.** Unless otherwise shown on the plan, provide polyethylene sheeting that is at least 6 mils thick and free from visible defects.

3. EQUIPMENT

Unless otherwise allowed by Engineer, provide concrete plant, mixing, hauling, and testing equipment conforming to the requirement of Section 421.3., "Equipment."

4. CONSTRUCTION

- 4.1. **Mix Design Proportioning.** The mix design shall be submitted to the Engineer for approval. Design the permeable concrete meeting the requirements shown in Table 2. Proportion permeable concrete using ACI 522R method.

Table 2
Mix Design Requirements

Property	Limit
Maximum Water-Cementitious Material Ratio	0.50
Coarse Aggregate to Cementitious Material Ratio	5:1
Nominal Maximum Aggregate Size, (in)	1/2 to 3/4
Void Content, %	15 to 25

- 4.2. **Mixing and Delivering.** Unless otherwise allowed by Engineer, mix and deliver permeable concrete in accordance to Section 421.6, "Mixing and Delivering Concrete."

- 4.3. **Placing and Consolidating.** Place concrete as near as possible to its final position. Do not deposit large quantities of concrete in one location and run or work concrete in forms. If necessary, use rakes or shovels to move concrete to final position.

Consolidate each layer of permeable concrete to create a compacted mass. Use enough consolidation to achieve a compacted mass without segregating the concrete. Strike off the top of the final surface and consolidate. Ensure that the surface of each lift retains an open texture.

- 4.4. **Curing.** Immediately after consolidating the final surface, cover the exposed concrete surfaces with polyethylene sheeting placed in close contact with the concrete surface. Anchor sheeting adequately to provide continuous contact with the exposed concrete surface.

Cure the permeable concrete for a minimum two days unless otherwise allowed. A curing day is a calendar day when the temperature, taken in the shade away from artificial heat, is above 50°F for at least 19 hrs. or on colder days if the temperature of all surfaces of the concrete is maintained above 40°F for the entire 24 hr.

- 4.5. **Sampling and Testing.** The Engineer will sample, make and test 7 day and 28 day compressive strength specimens. Acceptance will be based on the design strength requirement.

5. MEASUREMENT AND PAYMENT

Permeable concrete will be measured by the cubic yard as shown on the plans. Permeable concrete for structural backfill will be subsidiary to Item 423 Retaining Wall.