

Special Specification 5118

Porous Concrete Sidewalks



1. DESCRIPTION

Construct porous concrete in accordance with the details shown on the plans and the manufacturer's recommendations.

2. MATERIALS

Use materials from prequalified sources listed on the Department website. Provide coarse and fine aggregates from sources listed in the Department's Concrete Rated Source Quality Catalog (CRSQC). Use materials from non-listed sources only when tested and approved by the Engineer before use. Allow 30 calendar days for the Engineer to sample, test, and report results for non-listed sources. Do not combine approved material with unapproved material.

- 2.1. **Cement.** Furnish hydraulic cement conforming to DMS 4600, "Hydraulic Cement."
- 2.2. **Aggregate.** Use grade No. 8 coarse aggregate or No. 89 coarse aggregate per ASTM C 33.
- 2.3. **Admixtures.** Optional for the porous concrete design. If provided in the mix design, furnish admixtures conforming to DMS-4640, "Chemical Admixtures for Concrete."
- 2.4. **Water.** Furnish mixing and curing water that is free from oils, acids, organic matter, or other deleterious substances. Water from municipal supplies approved by the Texas Department of Health will not require testing. Provide test reports showing compliance with Table 1 before use when using water from other sources.

Table 1
Chemical Limits for Mix Water

Contaminant	Test Method	Maximum Concentration (ppm or mg/L)
Chloride (Cl)	ASTM C114	
Prestressed concrete		500
Bridge decks & superstructure		500
All other concrete		1,000
Sulfate (SO ₄)	ASTM C114	2,000
Alkalies (Na ₂ O + 0.658K ₂ O)	ASTM C114	600
Total solids	ASTM C1603	50,000

- 2.5. **Geotextile Fabric.** Utilize non-woven 4 oz. geotextile fabric.
- 2.6. **Base Material.** Furnish base material consisting of clean, durable, uniformly graded gravel with a particle size of 1-1/2 to 2 in.
- 2.7. **Subsoil Material.** Twelve inches of suitable subsoil in terms of support and infiltration required. A percolation or falling head test should be used to determine subsoil infiltration rate. A minimum infiltration rate of 0.52 in. per hour is required. Soils with an infiltration rate between 0.27 and 0.52 in. per hour have marginal infiltration capacity and may not be suitable for absorbing runoff. Sand, loamy sand, and sandy loam are generally considered suitable for infiltration and support.

3. EQUIPMENT

Provide machinery, tools, and equipment necessary for proper execution of the work. Furnish equipment in accordance with Item 360, "Concrete Pavement," as needed.

- 3.1. **Rollers.** Provide rollers in accordance with Item 210, "Rolling."
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4. CONSTRUCTION

Furnish uncontaminated materials of uniform quality in accordance with the plans and specifications.

Notify the Engineer of the proposed material sources and, when necessary, changes to material sources. The Engineer will verify the specification requirements are met before approving the sources for use. The Engineer may sample and test project materials at any time during the project to verify specification compliance in accordance with Item 6, "Control of Materials."

- 4.1. **Qualification.** At least 30 days before starting the work, provide the Engineer documentation of porous concrete installer's qualification and documentation of successful installation of porous concrete under similar job conditions.
- 4.2. **Cement Content.** Limit the total cementitious material from 564 to 700 lbs. per cubic yard. Test specimen must achieve design strength 3,000 psi within 56 days.
- 4.3. **Aggregate Content.** The volume of aggregate per cubic yard should be equal to 27 cu. ft. when calculated as a function of the unit weight determined in accordance with ASTM C 29 jiggling procedure.
- 4.4. **Mix Water.** Water-to-cement ratios between 0.27 and 0.34 should be used. Quantity should be such that the cement paste displays a wet metallic sheen without causing the paste to flow from the aggregate. (Mix water quantity yielding a cement paste with a dull-dry appearance has insufficient water for hydration.) Insufficient water results in inconsistency in the mix and poor aggregate bond strength. High water content results in the paste sealing the void system primarily at the bottom and producing a poor aggregate surface bond.
- 4.5. **Subsoil.** The subsoil must not be compacted or subjected to construction vehicle traffic or sediment prior to the placement of base. Subsoil work must be sequenced to minimize passes of construction vehicles in the beds themselves. If the excavated subsoil is exposed to rainfall runoff, it may accumulate fines. Grading should not occur during wet soil conditions to minimize smearing and sealing of the soil surface. If such sealing occurs, the surface must be scarified to restore natural texture and permeability.
- 4.6. **Geotextile Fabric.** A layer of non-woven 4 oz. geotextile fabric is to be placed on top of the natural subsoil prior to placing base material. The fabric should extend up to the natural earth sides and over the top of any adjacent berm. The purpose of the fabric is to prevent migration of fine material from the subsoil into the gravel base material.
- 4.7. **Base Material.** The base material should be compacted to a thickness of 8 in. with a static roller. Do not use a vibratory roller.
- 4.8. **Joints.** Install joints using compacting roller-jointer to a depth between 1/4 and 1/3 of the concrete thickness with joint spacing as noted on the plans for typical sidewalk section.
- 4.9. **Finished Surface.** Final surface finish should be achieved as part of the consolidation process. Bull floats and trowels must not be utilized on porous concrete.
- 4.10. **Curing.** Concrete must be allowed to cure after jointing. A plastic sheeting that is 6 mil (0.15mm) thick should be placed no later than 20 min. after discharge of concrete and must remain in place for 7 curing days minimum. A curing day is defined as a 24 hr. period when either the temperature taken in the shade away

from artificial heat is above 50°F for at least 19 hr. or the surface temperature of the concrete is maintained above 40°F for 24 hr.

- 4.11. **Final Flow Rate.** Porous Concrete must achieve a minimum flow rate of 2 gal. per minute per square foot.
- 4.12. **Opening Pavement to Pedestrian Traffic.** Pavement that is 7 days old may be opened to pedestrian traffic. Clean pavement, place stable material against the pavement edges, and perform all other traffic safety related work before opening to traffic.

5. **MEASUREMENT**

Porous Concrete for sidewalks will be measured by the square yard of surface area for porous concrete. Square yard calculations will be based on the neat dimensions shown on the plans or as adjusted by the Engineer.

6. **PAYMENT**

These prices are full compensation for materials (including geotextile fabric, base and subsoil material), equipment, labor, tools, and incidentals.

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for by the unit price bid for "Porous Concrete Sidewalks (4')." This price is full compensation for furnishing, hauling, and placing the materials.