

SECTION 201 – CONCRETE, MORTAR, AND RELATED MATERIALS

(New Section 201-1.1.6)

201-1.1.6 Pervious Concrete.

201-1.1.6.1 General. Pervious concrete shall consist of portland cement, coarse concrete aggregate, water, and when approved by the Engineer or specified in the Special Provisions, chemical admixtures, fly ash, or reclaimed concrete material.

201-1.1.6.2 Materials. Materials shall consist of:

- a) The coarse aggregate conforming to 200-1.4, No. 4 unless otherwise specified in the Special Provisions;
- b) Portland cement conforming to 201-1.2.1, Type II, unless otherwise specified in the Special Provisions;
- c) Chemical admixtures conforming to 201-1.2.4;
- d) Fly ash conforming to 201-1.2.5. The content of which shall be less than 25%, and;
- e) Reclaimed concrete materials conforming to 201-1.2.6.

201-1.1.6.3 Mix Design. A mix design shall be submitted to the Engineer for approval in accordance with 2-5.3. The mix design shall show the mix identification number and the applicable proportions, weights, and quantities of portland cement, aggregate, water, and where specified fly ash, admixtures, and reclaimed concrete material. The mix design submittal shall also include the size and source of aggregate, the type and source of portland cement and fly ash, the brand and designation of admixtures, and the type of construction for which the concrete is to be used.

The minimum cementitious material shall be 630 lbs/yd³ (10 Tonne/m³). The maximum water-to-cementitious ratio shall be 0.30 lb/lb (136 g/g), unless otherwise specified in the Special Provisions. If so specified in the Special Provisions or approved by the Engineer, a hydration stabilizing admixture conforming to ASTM C 494 Type B or a Type D admixture may be used. If so specified in the Special Provisions or approved by the Engineer, an air-entraining agent conforming to ASTM C 260 may be used.

SECTION 211 - MATERIAL TESTS

(New Section 211-3)

211-3 INFILTRATION CAPACITY TEST.

211-3.1 Test Apparatus. Test apparatus shall consist of a:

- a) One gallon (4L), minimum size, water container with a spout. The spout shall be able to produce a stream with a circular cross section, the diameter of that which is large enough to discharge the entire contents of the container in 20 seconds or less;
- b) Stopwatch capable of indicating elapsed time to the nearest second;
- c) Tape measure of at least 36 inches (1000mm) that is graduated in 1/4 inch (6 mm) increments or smaller.

211-3.2 Water. Water shall be free of suspended solids. The volume of water shall be determined to 2 significant figures.

211-3.3 Test Procedure. The testing procedure shall be as follows:

- a) Place a pre-measured amount of water into the container.
- b) Pour the water onto the surface in one spot. Control the discharge rate by manually adjusting the angle of the spout so that the diameter of the pool of water is between 10 to 30 inches (250mm to 760mm). Empty the container holding the spout over the spot until the pool of water vanishes.
- c) Start the stopwatch when the water initially touches the concrete surface and stop it when the pool disappears from the surface.
- d) Measure the longest dimension (d1) of the dampened area. Measure the width (d2) of the pool perpendicular to d1.
- e) Repeat this procedure at a minimum of 4 separate locations.

211-3.4 Infiltration Capacity. Infiltration Capacity shall be calculated as follows:

- a) The formula for U.S. Standard Measures shall be: $IC=(V)(3,326,400)/(p)(d_1)(d_2)(t)$ inches per hour.
- b) The formula for SI Units shall be: $IC=(V)(14.4X10^6)/(p)(d_1)(d_2)(t)$ cm per hour.

Where:

IC is Infiltration Capacity

V is the volume of water in gallons or liters

d1 and d2 are the dimensions that were determined in part 211-3.3

p is approximately 3.14159

211-3.5 Test Report. The test report shall include:

- a) The time and date of testing.
- b) The name and affiliation of the person performing the test.
- c) The location of the Work site.
- d) The location of each test site tested within the Work site.
- e) The volume of water used at each test site.
- f) The length of the two measurements taken at each test site.

- g) The discharge time for the water at each test site.
- h) The Infiltration Capacity at each test site.
- i) The average Infiltration Capacity for the Work site.

SECTION 303 – CONCRETE AND MASONRY CONSTRUCTION

(New Section 303-8)

303-8 Pervious Concrete.

303-8.1 General. Pervious concrete shall conform to 201-1.1.6. Pervious concrete shall be constructed a minimum of 6 inches (150mm) thick, unless otherwise specified in the Special Provisions or shown on the Plans.

303-8.2 Construction Test Section. The Contractor shall construct a test section using the same equipment, and placing crew as it proposes to use for the Work. The test section shall be a minimum of 225 ft² (7 m²) and may be placed non-contiguously.. The test section will be tested by the Agency in conformance with 211-3. The test section(s) may be incorporated into the Work if so approved by the Engineer. The Engineer shall be notified at least 24 hours in advance of construction of the test section.

303-8.3 Subgrade. The Subgrade shall be compacted to a relative compaction of between 92 and 96 percent. Chemical stabilization is not be permitted. The Subgrade shall have a minimum permeability of 0.5 inch per hour as determined by ASTM D 3385.

303-8.4 Forms. Forms shall conform to 302-6.2. Forms shall be placed to the full depth thickness of the pervious concrete. Forms shall be capable of supporting mechanical equipment without deformation during or following spreading, strike-off and compaction operations.

303-8.5 Placement. Pervious concrete shall be deposited over the entire width of the formed area. The concrete shall be placed and finished by a combination of vibration and consolidation using a vibrating truss screed and rollers such that the result is a coherent, stable mass of interconnected voids. Strike-off by hand-rodding may be allowed in small, constrained areas if so approved by the Engineer. During initial placement and prior to strike-off, pervious concrete shall not be walked on. Combined strikeoff/compaction equipment will be allowed if the compaction force exceeds 10 psi (70 kPa). The compactive force shall be calculated by dividing the weight of the compaction device by the contact area. The contact area for a roller shall be one percent of the total surface area of the roller.

Immediately after strike-off, the surface shall be consolidated to the cross-section shown on the Plans. Consolidation shall be performed by use of a roller or plate compactor with a vertically applied pressure of 10 psi (70kPA). Hand tampers shall be used to consolidate the pervious concrete along the slab edges immediately adjacent to the forms. The Contractor shall exercise caution during consolidation to insure that the surface voids do not become sealed. Over-consolidation and accumulation of excess paste at the concrete surface will not be allowed.

When tested in accordance with 302-5.6.2 the finished surface shall not deviate more than 3/8 inch (10mm) from a 10 foot (3 m) straightedge laid on the surface. Surface depressions shall be corrected immediately after consolidation by placing fresh pervious concrete in the depressions and compacting using a hand tamper.

After consolidation the surface shall be immediately water fogged until curing material is applied.

303-8.6 Weakened-Plane Joints.

303-8.6.1 General. Weakened-plane joints shall be constructed at the locations shown on the Plans or at regular intervals not to exceed two times the width of the placement or 40 feet (12m) on-center, whichever is less. Joints shall be constructed to a depth of ¼ the thickness of the pervious concrete with a minimum depth of 1 ½ inches (38mm). Transverse construction joints shall be installed whenever placing is suspended for more than 20 minutes.

303-8.6.2 Construction Weakened-plane joints may be constructed by one of the following methods as specified in the Special Provisions.

- a) Weakened-plane joints shall be constructed in fresh concrete and shall be formed by rolling a small roller to which a beveled fin has been attached around the circumference. Such joints are constructed immediately after compaction and prior to curing.
- b) Weakened-plane joints shall be constructed by saw cutting. Saw cut joints shall be constructed as soon as the concrete can be saw cut without raveling the joint edge. Only the area occupied by the saw shall be exposed. Immediately after sawing each joint, the area shall be heavily misted with water and recovered in accordance with 302-8.7.

303-8.7 Curing. Curing procedures shall begin within 20 minutes of concrete placement or 15 minutes when the wind is in excess of 5 miles per hour (8 kilometers per hour). When the wind is in excess of 5 miles per hour (8 kilometers per hour), evaporation retardant and curing compound or water fogging shall be used. The surface is then covered securely with polyethylene sheeting. Evaporation retardants, polyethylene sheeting and curing compound shall conform to 201-4. Polyethylene sheeting shall have a minimum thickness of 6 mils (152µm). The cover shall remain securely in place for a minimum of 7 days.

303-8.8 Acceptance. Pervious concrete shall have an infiltration rate of a minimum of 100 inches per hour (254 cm/hr) or as specified in the Special Provisions, when tested in Accordance with 211-3.

303-8.9 Measurement and Payment. Payment for pervious concrete shall be made at the Contract Unit Price per square foot (square meter) or cubic yard (cubic meter) basis as shown on the Bid.