

SECTION S507 – PERVIOUS CONCRETE

S507-1 DESCRIPTION

Work consists of furnishing and installing pervious concrete to be used for sidewalks and driveways as required in Contract Documents and as directed by Project Manager.

References to NYSDOT specifications are to be in accordance with latest edition of *NYSDOT Standard Specifications (US Customary Units)*.

S507-2 MATERIALS

Pervious concrete is to be manufactured in accordance with NYSDOT Section 501-2 Materials, with following modifications.

Design and produce pervious concrete mix in accordance with following. Produce homogeneous mixture consisting of cement, pozzolan (fly ash or ground granulated blast furnace slag), coarse aggregate, water reducing set retarding admixture, water reducing admixture, viscosity modifying admixture (VMA) and water.

Coarse aggregate is to be size designation 1 or 1A in accordance with NYSDOT Subsection 703-02 Coarse Aggregate. Aggregate/cement ratio is to be in range of 4:1 to 4.5:1.

Use Type I, II or I/II cement. Cementitious content is to be minimum of 520 pounds/cubic yard for size 1 aggregate, and minimum of 580 pounds/cubic yard for size 1A aggregate. Water/cementitious ratio is to be in range of 0.27 to 0.34.

At least one (1) week prior to placement of test section, provide Project Manager with following:

- List of all materials and source numbers
- Proposed mix design batch weights, including design unit weight
- Proposed production facility and location

S507-3 CONSTRUCTION DETAILS

S507-3.01 General

Construction details are to be in accordance with NYSDOT Section 501-3 Construction Details, with following modifications.

Provide at least one National Ready Mix Concrete Association (NRMCA) Certified Pervious Concrete Technician at construction site.

Mix pervious concrete in approved transit mix trucks, loading trucks to maximum of 80% of rated mixer capacity.

Thoroughly wet entire subbase surface for minimum of 2 hours immediately prior to placement of pervious concrete. Subbase is to be moist, without free standing water. Remove free standing water prior to placement of pervious concrete.

NRMCA Certified Technician is to check each truck for uniformity during discharge. Mixture water is to be such that cement paste displays "wet metallic sheen" without causing paste to flow from aggregate. Add additional water to mix if required by NRMCA Certified Technician, and follow with 20 mixing revolutions.

Pervious concrete is to be deposited as close to its final position as practicable and such that freshly poured pervious concrete enters mass of previously placed pervious concrete.

Practice of discharging pervious concrete onto subbase and pulling or shoveling pervious concrete to final placement is not allowed.

S507-3.02 Placement and Consolidation

Unless otherwise approved by Project Manager in writing, provide mechanical equipment of either slipform or form riding with following compactive unit that will provide minimum of 10 psi vertical force.

Pervious concrete is to be placed continuously to required cross section, not deviating more than +/- 1/4 inch in 10 feet from profile grade. Spreading and strike-off is to be rapid, immediately following placement of pervious concrete.

Preferred method of strike-off and consolidation is use of form riding roller screed (i.e. NRMCA "one-step method"). If approved by Project Manager, NRMCA "two-step method" may be used for consolidation. If two-step method is used, strike-off pervious concrete to approximately 3/8 inch to 3/4 inch above forms to allow for consolidation. After strike-off, consolidate pervious concrete to height of forms. Consolidation is to be accomplished by rolling over pervious concrete with steel roller, consolidating pervious concrete to height of forms.

Because of rapid hardening and high evaporation rates, delays in consolidation can cause problems. Generally, it is recommended that consolidation be completed within 15 minutes of placement and that pervious concrete be coated with curing aid and covered with polyethylene curing cover within 20 minutes of placement.

Edges near forms are to be consolidated using 12 x 12 inch steel tamp, float, or other similar device to prevent raveling of edges. If vibration (internal or surface applied) is used, it is to be immediately stopped when forward progress is halted for any reason.

After mechanical or other approved strike-off and consolidation operation, no other finishing operation will be allowed.

Placement widths will be restricted to maximum of 15 feet unless Contractor can demonstrate to Project Manager that placement width of greater than 15 feet can be competently done.

S507-3.03 Curing

Curing procedures are to begin within 20 minutes after placement of pervious concrete. Surface is to be covered with polyethylene curing covers (minimum 6 mil) in accordance with NYSDOT Subsection 711-04 Polyethylene Curing Cover (White Opaque), or other pre-approved covering material. Prior to covering, fog or light mist is to be sprayed above pervious concrete surface. Individual sections of curing cover are to overlap minimum of 18 inches. Curing cover is to overlap all exposed edges, and is to be fully secured throughout curing period (without using dirt) to prevent dislocation.

Curing cover is to remain on surface for full duration of cure time, minimum 7 days. Supply form insulating materials when air temperature is expected to fall below 40°F at any time during curing period. No traffic of any kind is to be allowed on pervious concrete during cure time.

S507-3.04 Joints

Contraction joints are to be installed at maximum 20-foot intervals, at depth of at least 1/4 thickness of pervious concrete section. Saw cut joints, if used, should be installed as soon as pervious concrete has hardened sufficiently to prevent raveling and uncontrolled cracking. Transverse construction joints are to be installed whenever placing is suspended sufficient length of time that pervious concrete may begin to harden. To assure aggregate bond at construction joints, bonding agent suitable for bonding fresh pervious concrete is to be brushed, rolled, or sprayed on existing concrete surface edges. Expansion joints will not be required except where pervious concrete abuts other concrete slabs or adjoining structures.

S507-3.05 Test Sample

At least two weeks prior to use, construct minimum 25 square feet test sample area at required thickness, and in accordance with Section S507-2 Construction Details. Test sample is to remain in place for duration of project to be used as reference for acceptance of pervious concrete.

Test sample is not to be incorporated into work, and is to be removed when ordered by Project Manager, and properly disposed of.

Satisfactory performance of test sample will be determined by:

- Void Structure: 15% minimum; 25% maximum in accordance with ASTM C1688
- Unit weight (Density): Unit weight is to be within 5 pounds/cubic foot of design unit weight in accordance with ASTM C1688
- Infiltration Rate: Infiltration rate is to be minimum of 100 inches/hour in accordance with ASTM C1701 (test is to be performed after 7 day cure period)
- Compacted Thickness: Core test section at minimum of 7 days and determine compacted thickness in accordance with ASTM C42 (compacted thickness is to be within 1/4 inch of required thickness)

If test sample does not meet performance criteria, it is to be removed and properly disposed of. Repeat process until an acceptable test sample has been properly constructed.

S507-3.06 Testing, Inspection and Basis of Acceptance

To verify unit weight and percent void content minimum of one test is to be done for each day's placement of pervious concrete in accordance with ASTM C 1688. Unit weight is to be within 5 pounds/cubic foot of design unit weight.

Fixed form thickness is to be determined by measuring from grade to top of forms prior to paving. Thickness is to be within 1/4 inch of required thickness.

Infiltration rate test is to be done after 7 day cure period at minimum of three locations approved of by Project Manager in accordance with ASTM C1701. Infiltration rate is to be minimum of 100 inches/hour.

Should any of these test results fall outside of specified limits, pervious concrete is to be removed and properly disposed of. Repeat construction of pervious concrete until an acceptable end product has been properly constructed.

S507-4 METHOD OF MEASUREMENT

Quantity to be measured for payment will be number of cubic yards of pervious concrete placed.

S507-5 BASIS OF PAYMENT

Unit price bid also includes cost of: all required work necessary to layout and construct pervious concrete; furnishing, placing, consolidating and finishing pervious concrete; forms; edges; construction, transverse, longitudinal and expansion joints; scoring pattern; joints at appurtenances; curing compounds; polyethylene or curing blankets; conforming to joint tolerance and quality requirements; providing, maintaining, removing and disposing test sample; and furnishing all labor, material and equipment necessary to complete work.

Payment will be made under:

| ITEM NO. | ITEM | PAY UNIT |
|----------|-------------------|------------|
| S507.01 | Pervious Concrete | Cubic Yard |

REVISED January 1, 2017