

# StoneyCrete™ Pervious Concrete Pavement System

General Specifications for:

StoneyCrete™ Pervious Portland Concrete Pavement  
**(StoneyCrete™ Admixture 1025)**

## Forward

**Stoney Creek Materials, L.L.C.** innovative **StoneyCrete™ Pervious Concrete** creates viable solutions for the storm water management and water quality standards that are readily becoming the norm for new and existing land development. This specification is presented as a recommended guide for horizontal applications implementing storm water management or a wear surface.

## Stoney Creek Materials, L.L.C.

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## SECTION 02755

**Pervious Concrete Pavement****PART 1 GENERAL**

## 1.01 SUMMARY

## A. Section Includes:

1. Sub-grade preparation
2. Installation of Portland Cement Pervious Pavement structures.

## B. Related Sections:

1. Section 02050 – Soils
2. Section 02060 – Aggregate
3. Section 02230 - Site Clearing
4. Section 02311 – Rough Grading
5. Section 02315 – Excavation & Fill
6. Section 02374 – Erosion Control Devices
7. Section 02321 – Aggregate Base Course

## 1.02 REFERENCES

## A. Annual Book of ASTM Standards, American Society for Testing and Materials (ASTM) Standards, Material References:

1. ASTM C 29 “Test for Unit Weight and Voids in Aggregate.”
2. ASTM C 33 “Specification for Concrete Aggregates.”
3. ASTM C 42 “Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
4. ASTM C 117 “Test Method for Material Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing.”
5. ASTM C 138 “Test Method for Unit Weight, Yield, and Air Content (Gravimetric ) of Concrete.”
6. ASTM C 150 “Specifications for Portland Cement” (Types I or II only).
7. ASTM C 172 “Practice for Sampling Fresh Concrete.”
8. ASTM C 260 “Specification for Air-Entraining Admixtures for Concrete.”
9. ASTM C 494 “Specification for Chemical Admixtures for Concrete.”
10. ASTM C 595 “Specifications for Blended Hydraulic Cements” (Types IP or IS only).
11. ASTM C 618 “Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete.”
12. ASTM C 989 “Specification for Ground Granulated Blast-Furnace Slag for use in Concrete and Mortars.”
13. ASTM C 1077 “Practice for Laboratories Testing Concrete and concrete Aggregates for use in Construction and Criteria Laboratory Evaluation.”
14. ASTM D 698 “Tests for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 5.5 Pound Rammer and 12-inch Drop.”
15. ASTM E 329 “Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as used in Construction.”
16. Stoney Creek” Pervious Concrete Reference Manual.

## 1.03 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Submit for review and approval by Engineer prior to placement.
  - 1. Submit certificates, signed by the materials producer and the paving subcontractor, stating that materials meet or exceed the specified requirements.
  - 2. Submit samples of coarse aggregates and filter fabric for review and approval by **StoneyCrete™** Certified Contractor/Finisher or an Owner's Representative.
  - 3. The mixing plant shall submit a current mix design with aggregate, cement, water, and admixture proportions for approval. In addition the mixing plant shall submit any available past compressive strength test data.

## 1.04 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. The Contractor and all subcontractors involved in preparation and installation of the StoneyCrete™ pervious concrete stormwater management system will be required to attend a pervious concrete stormwater management system class. Classes are available through **StoneyCrete™ Authorized Distributors and Training Centers**. Contact Stoney Creek Materials, L.L.C. P.O. Box 342306 Austin, Texas, 78734 Phone 512-261.0821 Toll Free 866.880.1006 or [info@stoneycreekmaterials.com](mailto:info@stoneycreekmaterials.com) for the distributor nearest you.

## 1.05 QUALIFICATIONS

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section.
- B. The use of an ACI Concrete Flatwork Certified Finisher is strongly recommended. Prior to the bid, any Concrete Placement Contractor should be pre-qualified prior to being allowed to bid on the project.
- C. Prior to award of the contract, the placing contractor shall furnish the Engineer a statement attesting the installation crew will follow all installation instructions given by a "Certified Trainer/Installer". To qualify the following must complete the following:
  - 1. A minimum of 2 completed **StoneyCrete™** Portland Cement Pervious Concrete Paving projects including:
    - a. Addresses of the projects.
    - b. Unit weight acceptance data.
    - c. In-Situ pavement test results including void content and unit weight.
  - 2. Proof of a current **StoneyCrete™** Portland Cement Pervious Paving Certification which must include the following items:
    - a. Technician Certification
    - b. Proof of taking a minimum of four (4) hours of classroom training on the history of pervious concrete paving, causes and prevention of failures in pervious concrete pavements, and proper pavement installation techniques.
    - c. Placement of at least two pervious sample panels of 2.5CY each during the class.
    - d. Written exam results with at least an 85% score.

3. Proof of a current **StoneyCrete™** Pervious Concrete Pavement Installer Certification, which must include:
    - a. A minimum of 15 hours (with a minimum of three separate pours) with on the job supervision.
    - b. The installer must demonstrate proficiency and achieve a passing grade in :
      - 1) Job preparation
      - 2) Problem recognition
      - 3) Placement ability
  4. Engineer authorized certification programs currently available:
    - a. **StoneyCrete™** Authorized Distributors contact Stoney Creek Materials, L.L.C. Austin, Texas, 512-261-0821, 866.880.1008 and, [info@stoneycreekmaterials.com](mailto:info@stoneycreekmaterials.com) for current distributor listings.
- D. Prior to award of the contract, the mixing plant shall furnish Owner/Owner's Representative a statement attesting to qualifications and experience and the following:
1. A minimum of 2 completed **StoneyCrete™** Portland Cement Pervious Concrete Paving projects with the following information:
    - a. Addresses of the projects.
- E. If the placing contractor and concrete producer have insufficient experience with **StoneyCrete™** Portland Cement pervious concrete pavement (less than 2 successful jobs or is not a **StoneyCrete™** Certified Contractor/Finisher), the placing contractor shall retain an experienced **StoneyCrete™** Certified consultant to monitor production, handling, and placement operations at the contractor's expense.
- F. Test Panels
1. In lieu of test panels, the contractor may provide examples at other project sites, with the concrete material from the same batch plant, that meet the engineer's approval.
  2. In the absence of satisfactory examples, Contractor is to place, joint and cure two test panels, each to be a minimum of 225 sq. ft. at the required project thickness to demonstrate to the Owner's Representative's satisfaction that in-place unit weights can be achieved and a satisfactory pavement can be installed at the site location.
  3. Test panels may be placed at any of the specified Portland Cement pervious locations. Test panels shall be tested for thickness in accordance with ASTM C 42; void structure in accordance with ASTM C 138; and for core unit weight in accordance with ASTM C 140, paragraph 6.3.
  4. Satisfactory performance of the test panels will be based on the following criteria. The project engineer has final authority to determine compliance.
    - a. Thickness no less than 3/8" of specified thickness.
    - b. Void Structure: 13% minimum; 25% maximum.
    - c. Unit weight plus or minus 5 pcf of the design unit weight.
  5. If measured void structure falls below 13% or if measured thickness is greater than or less than 3/8" the specified thickness or measured weight falls less than 5 pcf below unit weight, the test panel shall be removed at the contractor's expense and disposed of in an approved landfill, unless approved by the Engineer after field testing pavement for adequate water flow.
  6. If the test panel meets the above mentioned requirements, it can be left in-place and included in the completed work.

## 1.06 PROJECT CONDITIONS

## A. Protection of Existing Improvements

1. Protect adjacent work from splashing of paving materials. Remove all stains from exposed surfaces of paving, structures, and grounds. Remove all waste and spillage.
2. Do not damage or disturb existing improvements or vegetation. Provide suitable protection where required before starting work and maintain protection throughout the course of the work.
3. Restore damaged improvements, including existing paving on or adjacent to the site that has been damaged as a result of construction work, to their original condition or repair as directed to the satisfaction of the Owner, and authority having jurisdiction at no additional cost.

## B. Safety and Traffic Control:

1. Notify and cooperate with local authorities and other organizations having jurisdiction when construction work will interfere with existing roads and traffic.
2. Provide temporary barriers, signs, warning lights, flagmen, and other protections as required to assure the safety of persons and vehicles around the construction area and to organize the smooth flow of traffic.

## C. Weather Limitations:

1. Do not place StoneyCrete™ Portland cement pervious pavement mixtures when the ambient temperature is 40 degrees Fahrenheit or lower or 80 degrees Fahrenheit or higher, unless otherwise permitted in writing by the Owner's Representative.

**PART 2 PRODUCTS**

## 2.01 CONCRETE MIX DESIGN

- A. Contractor shall furnish a proposed mix design with proportions of materials to the Owner's Representative prior to commencement of work. The data shall include rodded unit weights determined in accordance with ASTM C29 paragraph 11, rodded unit weight.

## 2.02 MATERIALS

- A. Locally available material having a record of satisfactory performance shall be used. Samples of the following materials shall be submitted for the Owner's Representative's approval:
- B. Stone Recharge Beds / Base Course
  1. Drainage Reservoir base course aggregate for stone recharge bed shall be 1-1/2" chipped rock of constant gradation, washed, bearing no naturally occurring or worn surfaces, no fines. Unless otherwise approved by engineer, gradation shall be as follows:

Sieve Number	Percent Passing
2"	100
1 - 1/2"	10 - 30
1"	0

2. Filter fabric shall be Mirafi 140N, or approved equal.
3. Impervious liner – shall be Permalon, PLY-X 150, or approved equal. Install where shown on plans, i.e. placed vertically to separate porous concrete from solid concrete or asphalt paving sections or building walls or foundations.

C. Portland Cement Pervious Concrete

1. Cement: Portland Cement Type I or II conforming to ASTM C 150 or Portland Cement Type IP or IS conforming to ASTM C 595. Fly Ash Type C or F 20% maximum or Slag 40% maximum replacement for Portland Cement.
2. Aggregate: Use aggregate as per approved StoneyCrete™ mix design(s). All aggregate to conform to ASTM C 33, or subject to Engineer's approval. The aggregate MUST contain a minimum of 38% voids as determined by ASTM C 29. The size, type and material of the aggregate may vary to allow for locally available products to be used. However, if any variation of aggregate from approved design mix is to be used, submit data on proposed material (Containing sieve analysis and compressive strengths) in writing along with a representative sample (25 pounds minimum) to Stoney Creek Materials, L.L.C., Quality Control and Development. Austin, Texas and owner for written approval. AN APPROVED DESIGN MIX, BY SCM, MUST BE USED. All warranties are VOID without written approval by Stoney Creek Materials, L.L.C.
3. Admixtures. The following admixtures may be used in accordance with manufacturer's recommendations, if admixtures are used: CONTACT MANUFACTURER PRIOR TO ANY ADDITIONAL ADMIXTURES.
4. Pervious admixture, StoneyCrete™ 1025, shall be used per manufacturers recommendations and requirements.
5. Water: Potable shall be used.
6. Proportions:
  - a. The total cementitious material shall not be less than 564 lbs. per cu. yd.
  - b. Aggregate Content: the volume of aggregate, cement, water, and admixture per cu. yd. shall be equal to 27 cubic feet when calculated as a function of the unit weight determined in accordance with ASTM C 29 jigging procedure. Fine aggregate should not be used.
  - c. The aggregate/cement ratio shall be in the range of 4:1 to 4.8:1, unless otherwise approved by the engineer.
  - d. The unit weight of the concrete shall be range of +/- 5 lbs of the design unit weight and in a range of 105 lbs/cu. ft. to 132-lbs/cu ft. per ASTM C29, paragraph 12, shoveled unit weight, unless otherwise approved by the engineer.
  - e. Mix Water: Mix water shall be such that the cement paste displays a wet metallic sheen without causing the paste to flow from the aggregate. (Mix water yielding a cement paste with a dull-dry or gritty appearance has insufficient water for hydration and must be adjusted before use).
  - f. The water to cement ratio shall be 0.31 to 0.47. Insufficient water results in inconsistency in the mix and poor bond strength. High water content results in the paste sealing the void system primarily at the bottom and poor surface bond.

### **PART 3 EXECUTION**

#### 3.01 INSTALLATION

A. Construction Requirements:

1. Owner shall be notified at least 48 hours prior to all recharge bed and pervious paving work, including sub-grade preparation.

2. A pre-paving conference with the Owner's Representative, Architect, and Engineer shall be held two (2) days prior to beginning placing the pervious concrete. The contractor shall have the pervious concrete supplier's QC representative, dispatch and batch plant personnel, project foreman and the StoneyCrete™ Certified pervious concrete installer in attendance at this meeting.

B. Sub-grade Preparation:

1. It is essential that the permeability of the underlying native soils be preserved. DO NOT OVER COMPACT. Uniform compaction of cuts and fills are required. Verify pecculation rates prior to placement of storage aggregate to verify porosity. Protect bed areas from excessive construction equipment to prevent over compaction.
2. Where erosion of sub-grade has caused accumulation of fine materials and/or surface ponding, this material shall be removed with light equipment and the underlying soils scarified to a minimum depth of 3 inches with a York rake or equivalent and light tractor.
3. Where subgrade has been compacted due to construction traffic, subgrade shall be scarified to a depth sufficient to match the naturally occurring insitu state.
4. Bring sub-grade of stone recharge bed to line, grade, and elevations indicated. Fill and lightly regrade any areas damaged by erosion, ponding, or traffic compaction before the placing of stone.

C. Recharge Bed Installation:

1. Upon completion of sub-grade work, the Owner's Representative shall be notified and shall inspect at his discretion before proceeding with recharge bed installation.
2. Filter fabric and recharge bed aggregate shall be placed immediately after approval of sub-grade preparation. Any accumulation of debris or sediment, which has taken place after approval of sub-grade, shall be removed prior to installation of filter fabric at no extra cost to the Owner.
3. Place filter fabric in accordance with manufacturer's standards and recommendations.
  - a. Adjacent strips of filter fabric shall overlap a minimum of twelve inches (12").
  - b. Secure fabric at least two feet (2') outside of bed and take steps necessary to prevent any runoff or sediment from entering the storage bed.
  - c. Place impervious liner over geo-textile extending 2.5 times the depth of the cutout (minimum of 2') beyond toe of slope face at building face or interface with asphalt concrete, or 6" below the face as shown on plans. Secure as recommended by manufacturer.
4. Install coarse aggregate in 6-inch maximum lifts.
  - a. Compact each layer to uniformity using equipment like walk behind plate/roller compactor or approved equipment as approved by site engineer. DO NOT over compact to effect sub-grade compaction.
  - b. Install aggregate to grades indicated on the drawings.
5. Following placement of bed aggregate, the filter fabric shall be folded back along all bed edges to protect from sediment washout along bed edges.
  - a. A minimum of a two foot edge strip shall be used to protect beds from adjacent bare soil.
  - b. This edge strip shall remain in place until all bare soils contiguous to beds are stabilized and vegetated.
  - c. In addition, hay bales shall be placed at the toe of slopes that may be adjacent to beds to further prevent sediment from washing into beds during site development.
  - d. As the site is fully stabilized, excess filter fabric along bed edges can be cut back to gravel edge or StoneyCrete™ Pervious Pavement Surface.

**D. StonyCrete™ Portland Cement Pervious Pavement Concrete Mixing, Hauling and Placing:**

1. Mix Time: Truck mixers shall be operated at the speed designated as mixing speed by the manufacturer for 75 to 100 revolutions of the drum. Unless the batch plant is more than 30 minutes from the job, mix time of 75-100 revolutions should take place at the batch plant prior to driving to the job.
2. Transportation:
  - a. The Portland Cement aggregate mixture may be transported or mixed on site and should be used within one (1) hour of the introduction of mix water, unless otherwise approved by an Owner's Representative.
  - b. This time can be increased to 90 minutes when utilizing the hydration stabilizer specified in paragraph 2.02.C.3.b. as long as the temperature of the concrete does not exceed 90 degrees Fahrenheit.
  - c. Retempering of concrete on the job site- because **StonyCrete™** 1025 admixtures are added at the jobsite, some retempering may be required to properly hydrate the load.
  - d. Trucks used to transport pervious concrete shall dump all contents including rinse water before loading each and every load.
  - e. Trucks used to transport pervious concrete shall have no more than two (2) consecutive loads without rinsing, unless delivered by dump truck or if a stabilizing hydration agent is used in the pervious concrete mix design or if field experience proves that there is no significant concrete buildup in concrete mixer after delivery.
3. Eight to twelve hours prior to placing concrete, and immediately prior to the pour, the sub-base shall be soaked with water (do not allow surface ponding) to minimize effect of dry or warm storage aggregates or sub base from drawing moisture out of the plastic concrete. Project engineer may waive this requirement in wet conditions.
4. Discharge:
  - a. Each mixer truck will be inspected for appearance of concrete uniformity according to paragraphs above.
  - b. Water may be added to obtain the required mix consistency. Any water adjustments made at the jobsite shall be made by certified pervious concrete installer.
  - c. A minimum of 60-75 revolutions at the manufacturer's designated mixing speed, minimum of ten (10) minutes, shall be required following any addition of water to the mix.
  - d. Discharge shall be a continuous operation and shall be completed as quickly as possible.
  - e. Concrete shall be deposited as close to its final position as practicable and such that fresh concrete enters the mass of previously placed concrete.
  - f. Minimize the practice of discharging onto sub-grade and pulling or shoveling to final placement.
5. Placing and Finishing Equipment:
  - a. Unless otherwise approved by the Owner or Owner's Representative in writing, the Contractor shall provide mechanical placing equipment.
  - b. The pervious concrete pavement will be placed to the required cross section and shall not deviate more than +/- 3/8 inch in 12 feet from profile grade.
  - c. After mechanical or other approved strike-off, a tight radius-edging tool can be used to protect edge.
  - d. If vibration, internal or surface applied, is used, it shall be shut off immediately when forward progress is halted for any reason. The use of vibrating equipment is not recommended.

- e. The Contractor will be restricted to pavement placement widths of a maximum of fifteen (15') feet unless the Contractor can demonstrate competence to provide pavement placement widths greater than the maximum specified to the satisfaction of the Owner's Representative.
  - f. Do not over-finish the surface. Over-finishing can cause the cement paste to seal the voids below the surface and reduce drainage rate through the pavement.
6. Curing: For best performance, curing procedures must begin within 20 (twenty) minutes after the final placement operations.
- a. Mandated curing process: The pavement surface must be covered with a minimum six (6) mil thick polyethylene sheet or other approved covering material and anchored securely to keep the wind from blowing the plastic off the surface.
  - b. The cover shall overlap all exposed edges and shall be secured (without using dirt or stone) to prevent dislocation due to winds or adjacent traffic conditions.
  - c. A fog or light mist may be sprayed using a low or medium solid CONFILM™ like hydration-stabilizing agent or approved equivalent, with a pump sprayer above the surface when required due to ambient conditions (high temperature, high wind, and low humidity).
  - d. The cover shall overlap all exposed edges and shall be secured (without using dirt or stone) to prevent dislocation due to winds or adjacent traffic conditions.
  - e. Cure Time:
    - 1) Portland Cement Type I, II, – 7 days minimum.
    - 2) No truck traffic shall be allowed for 10 days (no passenger car/light trucks for 7 days and no pedestrian traffic for 24 hours).
7. Jointing:
- a. Control (contraction) joints shall be installed at intervals of a maximum of 30 feet or as indicated by plans. They shall be installed at a depth of 1/4 the thickness of the pavement.
  - b. Sawed joints are substantially more durable than wet joints.
    - 1) Saw cutting should begin as soon as the pavement has hardened sufficiently to prevent raveling and uncontrolled cracking.
    - 2) Possible complications from saw cutting include:
      - a) If plastic is removed to accommodate saw cutting, re-hydrating by flushing surface with water after cutting and before replacing plastic..
      - b) Avoid walking on pervious concrete surface for first 24 hours to protect the aggregate-to-aggregate cementitious bond during initial set.
      - c) Saw cutting pervious concrete will introduce dust or slurry into the pervious concrete. Vacuum or flush to remove this slurry or dust.
  - c. Transverse construction joints shall be installed whenever placing is suspended a sufficient length of time that concrete may begin to harden. If contractor attempts to “blend” a fresh pour into a earlier pour “RAVELING” will occur. Minimize the time between loads to reduce this “accidental cold joint”.
  - d. Isolation (expansion) joints will not be used except when pavement is abutting slabs or other adjoining structures.
  - e. If transverse or isolation joints are used, or where pervious concrete meets impervious pavement, extra compaction may be necessary. Using a cumalong as a tamping tool may be sufficient to reduce raveling.

- f. Additional installation specifications for the “StoneyCrete™” concrete provided by the material source shall be followed strictly.
- E. **StoneyCrete™** Portland Cement Pervious Pavement Concrete Testing, Inspection, and Acceptance:
1. Laboratory Testing:
    - a. An approved laboratory will conduct testing.
    - b. The Laboratory shall complete testing within 2-weeks from receiving of cores.
  2. Testing and Acceptance: Resident Owner’s Representative shall specify the location of the cores, which shall include any areas of the finished surface not appearing pervious. The cores shall be measured for thickness, void structure, and unit weight. Untrimmed, hardened core samples shall be used to determine placement thickness. The average of all production cores shall not be less than the specified thickness with no individual core being more than ½ inch less than the specified thickness. After thickness determination, the cores shall be trimmed and measured for unit weight per ASTM C 642-97. Ranges of satisfactory unit weight values are +/- 5 pcf of the design unit weight.
    - a. Base Rock: A minimum of 1 gradation test of the subgrade is required every 5,000 square feet to determine percent passing the No. 200 sieve per ASTM C 117.
    - b. StoneyCrete™: **Either of following procedures may be used.**  
A minimum of one set of tests for each day’s placement of pervious concrete in accordance with ASTM C 172 and ASTM C 29 to verify unit weight shall be conducted.
      - 1) Delivered unit weights are to be determined in accordance with ASTM C 29 using a 0.25 cubic foot cylindrical metal measure.
      - 2) Provide minimum of three cores in accordance with ASTM 42 with a minimum of seven (7) days in place curing.
- F. Maintenance:
1. There shall be a maintenance plan submitted to the owner to prevent the clogging of the StoneyCrete™ pervious concrete pavement, which shall include periodic testing for flowability and methods to restore flowability if the flow rate drops below 50% of the original rate. Acceptable methods to restore levels of flowability are to vacuum, flush the pervious concrete sections with high volume-low pressure wash or to spray enzymes that digest organic materials on to the pervious concrete sections during wet seasons of the year without excessively low temperature.
  2. Note: Stoney Creek Materials, L.L.C. and/or the installation contractor cannot assume nor will assume any responsibility for the ongoing maintenance of the pervious system.

**Special Note:** This information is intended to be used by the design professionals competent to evaluate its significance and limitations and who will accept the responsibility for its proper application. The Stoney Creek Materials, L.L.C. of Austin, Texas, U.S.A. disclaims any and all responsibility for any other use of the information supplied herein.

END OF SECTION