PRESTO GEOSYSTEMS

GEOBLOCK®
POROUS PAVEMENT SYSTEM
PRODUCT SPECIFICATION CSI-FORMAT

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Jan 2019

Product Specification (CSI Format)

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) Format, including *MasterFormat, SectionFormat,* and *PageFormat,* contained in the CSI *Manual of Practice.*

The section shall be carefully reviewed and edited by the Engineer to meet all specific project and applicable code requirements. Coordinate with corresponding specification sections, details and drawings.

Contract Documents shall refer to the drawings and specifications prepared and approved by the Engineer.

Delete all "Specifier Notes" when editing this section.

SECTION _____
POROUS FLEXIBLE PAVING

Specifier Notes: This section covers Presto Geosystems Geoblock® Porous Pavement System. The system provides vehicular and pedestrian load support over grass areas while promoting natural storm water infiltration and protection to grass from the harmful effects of traffic.

The major components of the complete system are the Geoblock® porous pavement unit, engineered base support soil where needed, selected topsoil, and selected vegetation.

Consult Presto Geosystems for assistance in editing this section for the specific application.

PART 1 GENERAL

1.1 SUMMARY

A. Work Included: This Section includes providing all material, labor, tools and equipment for installation of the Geoblock® porous pavement system as shown in the Contract Documents and as specified in this Section.

B. The Geoblock® porous pavement system shall be used for vegetated porous pavement.

1.2 RELATED SECTIONS

A. Section 312000 – Earth Moving.

B. Section 334600 – Subdrainage.

C. Section 321000 – Bases, Ballasts, and Paving.

Specifier Notes: Edit the following list as required for the project. List other sections with work directly related to the porous pavement system.

D. Section 323000 - Site Improvements.

E. Section 329000 - Planting.

F. Section 329200 – Manufacturers of Turfs and Grasses.

1.3 REFERENCES

A. CBR – California Bearing Ratio Method.

B. ASTM D1693 – Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics.

C. ASTM F 1951-08 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.

D. American Association of State Highway and Transportation Officials (AASHTO)

E. U.S. Green Building Council, LEED® Building Design and Construction (BD+C) version 4.0 Rating System. (LEED v4.0).

1.4 SYSTEM DESCRIPTION

A. The Geoblock® porous pavement system provides vehicular and pedestrian load support over grass areas, while protecting grass from harmful effects of traffic.

B. Major Components of the Complete System include:

1. Geoblock® porous pavement unit
2. Engineered base support soil
3. Selected topsoil
4. Selected vegetation
5. Steel anchors (if required)

C. Both the Geoblock® porous pavement unit and base support soil (if required) work together to support imposed loading.

D. Both the Geoblock® porous pavement unit and topsoil contribute to vegetation support.

1.5 SUBMITTALS

A. Submit manufacturer's shop drawings in accordance with Section 013000 including manufacturer’s product data, general laying pattern and anchoring.

B. LEED® Submittals: Provide documentation of how the requirements of Credit will be met:

1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.

C. Certificates:

1. Product certificates signed by the manufacturer certifying material compliance of polyethylene used to make Geoblock® porous pavement units.

2. ISO Certificate certifying manufacturer’s quality management system is currently registered to ISO 9001:2015 quality standards.

Specifier Note: Delete installer and Manufacturer's field representative qualifications if not required.

D. Submit qualifications certifying installer experience in the installation of Geoblock® Porous Pavement Systems.

E. Submit qualifications of Manufacturer's field representative certifying field representative experience in the installation of Geoblock® Porous Pavement Systems.

F. No material will be considered as an equivalent to the Geoblock® porous pavement unit specified herein unless it meets all requirements of this specification, without exception. Manufacturers seeking to supply equivalent material must submit records, data, independent test results, samples, certifications, and documentation deemed necessary by the Engineer to prove equivalency. The Engineer shall approve or disapprove other Manufacturers materials in accordance with the General Conditions after submission and review of provided information. All substitute materials submitted shall be subject to independent lab testing at the contractor's expense.

1.6 QUALITY ASSURANCE AND CONTROL

A. The Geoblock® porous pavement unit shall be provided from a single Manufacturer for the entire project.

B. The Manufacturer's Quality management system shall be certified and in accordance with ISO 9001:2015. Substitute materials submitted shall provide a certification that the manufacturing process is part of an ISO program. Certification is required specifically stating that their testing facility is certified and in accordance with ISO. An ISO certification for the substitute material will not be acceptable unless it is proven it pertains specifically to the Geoblock® manufacturing operations.

C. The Manufacturer shall provide certification of compliance to all applicable testing procedures and related specifications upon the customer's written request. Request for certification shall be submitted no later than the date of order placement. The Manufacturer shall have a minimum of 20 years' experience producing porous pavement systems.

Specifier Note: Delete requirement for pre-installation meeting if not required.

D. Pre-Installation Meeting: Prior to installation of any materials, conduct a pre-installation meeting to discuss the scope of work and review installation requirements. The pre-installation meeting shall be attended by all parties involved in the installation of the Geoblock® porous pavement system.

Specifier Note: Delete this section if Manufacturer's Field Representative is not required.

1. Manufacturer shall provide a qualified field representative on site at the start of construction to ensure the system is installed in accordance with the Contract Documents.
2. Manufacturer's field representative shall have a minimum of 5 years installation experience with the specified products in the specified application.
3. Manufacturer of any substitute materials to be used shall certify that a representative can meet the above criteria and will be on site for initial construction start up. Manufacturers other than the specified Geoblock® porous pavement system will be required to provide proof the representative meets these qualifications.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in Manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and Manufacturer.

B. The materials shall be stored in accordance with Manufacturer's instructions. The materials shall be protected from damage and out of direct sunlight.

C. The materials shall be delivered, unloaded and installed in a manner to prevent damage.

1.8 WARRANTY

A. The Manufacturer warrants each Geoblock® porous pavement unit that it ships to be free from defects in materials and workmanship at the time of manufacture. The Manufacturer's exclusive liability under this warranty or otherwise will be to furnish without charge to the original f.o.b. point a replacement for any section which proves to be defective under normal use and service during the 10-year period which begins on the date of shipment. The Manufacturer reserves the right to inspect any allegedly defective section in order to verify the defect and ascertain its cause.

B. This warranty shall not cover defects attributable to causes or occurrences beyond the Manufacturer's control and unrelated to the manufacturing process, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation, improper alteration or improper application.

C. In no event shall the Manufacturer be liable for any special, indirect, incidental or consequential damages for the breach of any express or implied warranty or for any other reason, including negligence, in connection with the Geoblock® porous pavement system.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Presto Geosystems, PO Box 2399, Appleton, Wisconsin 54912-2399. Toll Free (800) 548-3424. Phone (920) 738-1328. Fax (920) 738-1222. E-Mail info@prestogeo.com Website www.prestogeo.com.

2.2 GEOBLOCK® POROUS PAVEMENT SYSTEM COMPONENTS

Specifier Notes: All measurements are subject to manufacturing tolerances, unless otherwise specified.

A. Geoblock® Units:

1. Base Materials:
   a. The material shall be up to 100 percent recycled polyethylene.
   b. The color shall range from dark shades of gray to black
   c. The color shall remain uniform throughout all units in pallet.
   d. The chemical resistance of the Geoblock® porous pavement units shall be superior.
   e. The Carbon Black content shall be 1.5 to 2 percent by weight, through addition of a carrier with ASTM D 1693.
2. Performance Properties:
   a. The empty unit minimum crush strength at 70 degrees F (21 degrees C) shall be 420 psi (2,900 kPa).
   b. The sand-filled unit minimum crush strength at 70 degrees F (21 degrees C) shall be 5,980 psi (41,285 kPa).
   c. The flexural modulus at 70 degrees F (21 degrees C) shall be 35,000 psi (240,000 kPa).
   d. The unit minimum deflection without breakage when units supported at 40 inches (0.50 m) centers at 70 degrees F (21 degrees C) shall be 1.0 inches (25 mm).
   e. The wall compressive strength (simulated tire area loaded) shall be 420 psi (2,900 kPa) when tested using circular plate, 6.5 inches (165 mm) in diameter, and loaded to failure.
   f. The wall compressive strength (full Geoblock® porous pavement unit loaded) shall be 138,240 pound-force (615 kN) when tested using full single unit loaded to failure via flat plate.
   g. The equivalent elastic stiffness shall be 48,000 pound-square inches (140 N-m2) when tested using simply supported Geoblock® porous pavement unit loaded to 1 inch (25 mm) deflection.
   h. The joint shear strength shall be 20,000 pound-force (89.0 kN) when tested using direct shear of tabular connection using special apparatus.
3. Dimensions:
   a. The nominal product width shall be: 20 inches (0.5 meter).

b. The nominal product length shall be 40 inches (1 meter).
c. The nominal product depth shall be 1.2 inches (30 mm).
d. The nominal product area shall be 5.3 feet2 (0.5 m2).
e. The nominal product weight shall be 4.7 pounds (2.1 kg).
f. Each unit shall have 182 cells.
   1. The nominal cell size shall be 2.25 inches x 2.25 inches (57 mm x 57 mm).
g. The top open area per unit shall be 88 percent.
h. The bottom open area per unit shall be 56 percent.
i. There shall be interlocking offset tabs on the edges of the unit.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions are as indicated on the drawings. Notify the Engineer if site conditions are not acceptable. Do not begin preparation or installation until unacceptable conditions have been corrected.

B. Verify layout of structure is as indicated on the drawings. Notify the Engineer if layout of structure is not acceptable. Do not begin preparation or installation until unacceptable conditions have been corrected.

3.2 PREPARATION

Specifier Note: If required, specify the number of days required for the on-site manufacturer's field representative. Delete this section if not required.

A. Field Representation:

1. On-site time for installation assistance by the Manufacturer's field representative shall be _____ day(s) with one trip. All travel and expense costs for Manufacturer's field representative installation assistance shall be included in the base bid price.

B. Subgrade:

1. Prepare subgrade and install porous pavement system in accordance with the Drawings and Manufacturer's instructions.

2. Subgrade Preparation

   a. Excavate and shape foundation soils as indicated on the Drawings.

   b. Ensure foundation soil meets minimum strength requirements through proof rolling or other conventional method and is approved by the Engineer. If unacceptable foundation soils are encountered, excavate and replace with suitable quality material as directed by the Engineer.

Specifier Note: Delete this section if a geotextile separation layer is not required.

   c. Install geotextile separation layer on prepared surfaces ensuring required overlaps are maintained and outer edges of the geotextile are buried in accordance with the Manufacturer's recommendations and sub grade CBR.

C. Base Preparation:

Specifier Notes: The strength of the porous pavement system is determined, in part, by the support provided by the topsoil/aggregate engineered base. Consult Presto Geosystems Geoblock® *Design and Construction Overview* for engineered base details and thickness recommendations.

Proper topsoil/aggregate engineered base materials will promote vegetative growth and provide required structural support. If the topsoil is not present within the engineered base, grass growth may be impaired. Vegetated surfaces should be designed for infrequent or occasional traffic.

1. Install base as specified. Verify engineered base is installed in accordance with porous pavement system Manufacturer's instructions.
2. Coordinate base installation and preparation with subdrains specified in Section 334600.
3. If required, install the specified sub-drain and outlet according to construction drawings.
4. Place engineered base to a depth of _____ (inches, mm), or as specified in the Contract Documents.
5. Place engineered base open graded crushed rock having an AASHTO #5 or similar designation homogenously blended with topsoil.
   a. Ensure aggregate portion of base is free from fines and has a known percentage void-space of 30% or greater when compacted.
   b. Particle size shall range in size from 0.375 to 1.0 inch (9.5 to 25 mm).
   c. Add and blend pulverized topsoil before placement equal to void percentage in aggregate.
   d. Pulverized topsoil portion shall equal plus or minus 33% of the total volume and be added and blended to produce a homogenous mixture.
   e. Compact the mixture to the Engineer's specifications.
6. Constrain the edges of the base appropriately to prevent movement.

3.3 INSTALLATION OF POROUS PAVEMENT SYSTEM

A. Install and infill Geoblock® porous pavement units in accordance with porous paving system Manufacturer's instructions.
   1. Ensure that all adjacent hard-surfaced paving work is completed before installing the Geoblock® porous pavement system.
   2. GEOBLOCK UNITS ARE CAPABLE OF BEARING LOAD IMMEDIATELY after placement, once fully installed and the base depth is appropriate to support the loading. Geoblock® porous pavement units can be driven on with no infill necessary. No barriers are required to prevent passenger cars and trucks or construction equipment from driving on the Geoblock® porous pavement units during installation.

B. Installing Geoblock® Units
   1. Place units with the square hole to the ground.

Specifier Notes: Edit the installation requirements for the laying pattern as indicated on the drawings.

   2. Lay units in the following pattern:
      a. Install unit pattern as indicated on the Drawings.
      b. Standard running bond bricklayer pattern for pedestrian access lane or one-direction vehicular driveway applications.
      c. Herringbone pattern for large area with multi-directional traffic flow.
   3. Fbricklayer pattern, place units with long direction of unit perpendicular to direction of traffic.
   4. Develop staggered herringbone pattern by using half units made by field cutting a full unit.
   5. Field cut units to custom fit contours and around obstructions. Edge restraints are required to create a

closed "cell" that can be infilled. Alternatively, offset the Geoblock® units such that the coverage approximates the corner or curve feature. Edge restraints are required.

6. Place first row of Geoblock® porous pavement units against a single stationary edge, when available. If the units are placed between two perpendicular stationary edges, allow for potential thermal expansion of the units by keeping the units away from the stationary edge.
7. Slide units together so interlocking tab joint is fully engaged. Units shall not protrude above desired surface elevation.

Specifier Notes: Specify units to be fixed in place during the installation process if construction traffic may cause movement of the units during installation.

The plastic has a relatively high rate of thermal expansion. Joint separation could occur and rejoining of separated units may be required. Once a healthy turf is developed, the root system will provide all necessary anchoring of the system.

8. Prevent units from shifting during installation with placement of one of the following:
   a. Temporary wood stakes or permanent metal stakes through holes in the Geoblock® units.
   b. Thread-forming tapping screws through perimeter interlocking tabs. Install 2 to 4 screws on the long side and 1 to 2 screws on the short side. Refer to the Geoblock® Application and Installation Overview or consult Presto Geosystems for details.

Specifier Notes: Anchoring may be required when placing the Geoblock® porous pavement units on a slope (5-10% maximum). Stake length is generally 12 inches (305 mm) or longer depending on the slope, subgrade CBR and loading requirement. Edit the anchor length as required. Delete this section if anchoring is not required.

C. Anchoring of Geoblock® Units:

1. Units shall be anchored per Manufacturer's recommendations.
2. Units shall be anchored in-place after installation of all the units within the defined area.
3. Units shall be anchored with 0.5 inch (13 mm) #4 rebar or wood stakes to prevent movement of the units.
4. Anchor length shall be 12 inches (305 mm) or as specified by the Engineer.
5. Anchoring spacing shall be per Contract Documents.
6. Drive the anchors through the holes in the Geoblock® porous pavement units along the perimeter as required.

D. Infilling Geoblock® Units

1. Infill units with pulverized topsoil immediately after units are installed.
   a. Runoff Coefficient is dependent upon the actual site conditions and Geoblock® porous pavement system infill material.
   b. Runoff Coefficient @ 2.5 in/hr (64 mm/hr) rainfall shall be 0-0.15.
   c. Typical runoff coefficients range from 0 to 0.15 for sandy and clay soils, respectively.
   d. The actual run-off coefficient shall be based on site conditions, engineering judgment and the integrated effect of the drainage area.
2. Spread topsoil infill uniformly over units to a level even with the top of the cell wall.
3. Use spreading methods to prevent over-compaction of cell infill.
4. Overfilling the cells is not recommended since vehicular loading will cause undesirable compaction of the topsoil.
5. Broom or rotary sweep the infilled surface to remove the top portion of topsoil infill from the Geoblock cells so it has a meniscus appearance. Final topsoil placement should be slightly below the level of the Geoblock cell wall.
6. If final vegetation is sod, the Geoblock® porous pavement units shall be under-filled by sod depth to allow room to seat or press sod into Geoblock® porous pavement units.
7. Topsoil: As specified in Section 329200 Manufacturers of Turfs and Grasses.

Specifier Notes: With vegetated systems, once healthy turf has been established, the Geoblock® cell wall structure will have minimal visibility when good turf-maintenance practices are followed. Delineation may be desirable to create greater visibility for those using the access lanes. Choose delineation methods, or delete this section if not required.

3.4 ABOVE GROUND, POST-INSTALLATION DELINEATION

A. Delineate the Geoblock® porous pavement system above ground, after installation is complete, with one of the following methods:
   1. Above-ground curbing
   2. Shrubbery or vegetation
   3. Perimeter lighting
   4. Delineation markers

3.5 SEED AND GRASSING

A. Finish in accordance with Manufacturer's instructions.

Specifier Notes: Choose Seed or Sod and delete the other choice. Specify sod for areas where immediate use is desired.

B. Seeding:
   1. The seed mix shall be as shown on the drawings or as specified in the Contract Documents.
   2. Follow good seeding, fertilizing, and watering procedures for turf establishment based on regional practices as specified in Section 329200 Manufacturers of Turfs and Grasses.
   3. Seed shall conform with the requirements of the governing authority for seeding and restrictions on noxious weed seed.

C. Sod:
   1. The sod shall be free from netting material, and as specified in the Contract Documents.
   2. Sweep out topsoil from the Geoblock® units to allow room to seat the sod. Remove enough topsoil so that the crown of the sod is recessed slightly below the top of the cell after pressing the sod in place, and so the bottom of the sod is in contact with the topsoil.
   3. Install sod free from netting materials. The sod shall consist of dense, well-rooted growth of permanent and desirable grasses, indigenous to the locality where it will be installed.
   4. Press sod into partially emptied cells using a roller or other suitable equipment.
   5. Follow recommended watering procedures to ensure healthy sod growth.
   6. Sodding: As specified in Section 329200 Manufacturers of Turfs and Grasses.

3.6 MAINTENANCE

A. Maintain grass in accordance with manufacturer's instructions and as specified in Section 329200 Manufacturers of Turfs and Grasses.

B. Lawn Care: Normal turf care procedures should be followed, including de-thatching and aerating. Some equipment may slightly scar or cut the Geoblock® wall structure during some operations, but will not affect overall structural integrity of the system.

Specifier Notes: *Snow Removal* applies to climates where snow removal is required. When deeper ground freeze occurs, the system functions as a typical hard pavement surface. If a sharp metal plow-blade comes in direct contact with the surface during plowing, any portion of the Geoblock® porous pavement system that protrudes above the normal surface level could be damaged or removed by the blade.

C. Snow Removal: Remove snow using one of the following basic procedures:
   1. Keep a metal edged plow blade a minimum of 1.0 inch (25 mm) above the surface during plowing operations, or
   2. Use a plow blade with a flexible rubber edge, or
   3. Use a plow blade with skids on the lower outside corners so the plow blade does not come in contact with the units.

END OF SECTION