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Product Specification (CSI Format)

Specifier Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) Format, including *MasterFormat* (1995 Edition), *SectionFormat*, and *PageFormat*, contained in the *CSI Manual of Practice*.

The section must be carefully reviewed and edited by the Engineer to meet the requirements of the project and local building code. Coordinate with other specification sections and the drawings.

Delete all "Specifier Notes" when editing this section.

SECTION 321243 POROUS FLEXIBLE PAVING

Specifier Notes: This section covers Presto Geosystems Geoblock®5150 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 Geoblock5150 unit, engineered base support soil where needed, selected topsoil, and selected vegetation.

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

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Porous pavement system.

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. The American Society of Testing and Materials (ASTM)
- B. American Association of State Highway and Transportation Officials (AASHTO)

- C. American Society of Landscape Architects (ASLA)
- D. US Green Building Council (USGBC)

1.4 SYSTEM DESCRIPTION

- A. The Geoblock®5150 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. Geoblock5150 unit
 - 2. Engineered base support soil (if required)
 - 3. Selected topsoil
 - 4. Selected vegetation
- C. Both the Geoblock5150 unit and base support soil (if required) work together to support imposed loading.
- D. Both the Geoblock5150 unit and topsoil contribute to vegetation support.

1.5 SUBMITTALS

- A. Submit under provisions of Section 0130000.
- B. Product Data: Submit manufacturer's product data.
- C. Shop Drawings: Submit manufacturer's drawings including general laying pattern and anchoring from the *Geoblock®5150 Application and Installation Overview* (not site specific).
- D. 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.
 - 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
- E. Samples: Submit manufacturer's sample of Geoblock5150.
- F. Certificates:
 - 1. Product certificates signed by the manufacturer certifying material compliance of polyethylene used to make Geoblock5150 units.
 - 2. ISO Certificate certifying manufacturer's quality management system is currently registered to ISO 9001:2008 quality standards.
- G. Installation Instructions: Manufacturer's printed installation instructions. Include methods for maintaining installed products.
- H. Manufacturer's warranty.
- I. Substitutions: No material will be considered as an equivalent to the Geoblock5150 unit specified herein unless it meets all areas of this specification without exception. Manufacturers seeking to supply what they represent as equivalent material must submit records, data, independent test results, samples, certifications, and documentation deemed necessary by the Specifier to prove equivalency. The Specifier shall approve or disapprove other manufacturers materials within 60 days after all submitted information is studied and tested.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Material Certification: Product manufacturers shall provide certification of compliance with all applicable testing procedures and related specifications upon written request. Request for certification shall be submitted by the purchasing agency no later than the date of order placement.

Product manufacturers shall also have a minimum of 20 years experience producing products for porous pavement systems.
- B. Manufacturer Quality Certification: ISO Certification certifying manufacturer's quality management system for

its Geoblock5150 system is currently registered to ISO 9001:2008 quality standards.

Any alternate materials submitted shall provide a certification that their porous pavement system manufacturing process is part of an ISO program and a certification will be required specifically stating that their testing facility is certified and in accordance with ISO.

- C. Manufacturer's Field Representative Qualifications: The representative shall have at least 2 years experience installing the Manufacturer's porous pavement system and have installed a minimum of 10,000 square feet (1,000 square meters).
- D. Installer Qualifications: Experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- E. Pre-Installation Meeting: Prior to installation of any materials, conduct a pre-installation meeting to discuss the scope of work and review the installation requirements. The pre-installation meeting shall be attended by all parties involved in the installation of the porous pavement system.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in accordance with manufacturer's instructions.
- C. Handling: Protect materials during handling and installation to prevent damage.

1.8 MAINTENANCE SERVICE

Specifier Notes: Once healthy turf has been established, the cell wall structure will have minimal visibility when proper turf maintenance practices are followed.

- A. Follow proper turf maintenance practices, once healthy turf has been established.
- B. Maintenance Service: As specified in Section 329200 Manufacturers of Turfs and Grasses.

1.9 LIMITED WARRANTY

- A. Presto Geosystems warrants each Geoblock5150 unit which it ships to be free from defects in materials and workmanship at the time of manufacture. Presto's exclusive liability under this warranty or otherwise will be to furnish without charge to Presto's customer at the original f.o.b. point a replacement for any unit which proves to be defective under normal use and service during the 10-year period which begins on the date of shipment by Presto. Presto reserves the right to inspect any allegedly defective unit in order to verify the defect and ascertain its cause.
- B. Materials submitted that do not offer a written 10-year warranty will be rejected.
- C. This warranty does not cover defects attributable to causes or occurrences beyond Presto's control and unrelated to the manufacturing process, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation or improper application.
- D. This warranty does not cover defects attributable to causes or occurrences beyond Presto's control and unrelated to the manufacturing process, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation or improper application. Presto makes no other warranties, express or implied, written or oral, including, but not limited to, any warranties or merchantability or fitness for any particular purpose, in connection with the Geoblock5150 system. In no event shall Presto 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 Geoblock5150 system.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Acceptable 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®5150 UNITS

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

- A. Materials:
1. Material: Up to 97 percent recycled polyethylene.
 2. Color: Ranges from dark shades of gray to black
 3. Color Uniformity: Uniform color throughout all units in pallet.
 4. Chemical Resistance: Superior.
 5. Carbon Black for Ultraviolet Light Stabilization: 1.5 to 2.0 percent.
- B. Performance Properties:
1. Unit Minimum Crush Strength (Empty) at 70 degrees F (21 degrees C): 420 psi (2,900 kPa)
 2. Unit Minimum Crush Strength (Sand-Filled) @ 70 degrees F (21 degrees C): 7,058 psi (48,734 kPa)
 3. Flexural Modulus @ 70 degrees F (21 degrees C): 35,000 psi (240,000 kPa).
 4. Unit Minimum Deflection Without Breakage When Units Supported at 40 inches (0.50 m) Centers at 70 degrees F (21 degrees C): 1.0 inches (25 mm).
 5. Wall Compressive Strength (Simulated Tire Area Loaded): 420 psi (2,900 kPa) when tested using circular plate, 6.5 inches (165 mm) diameter, loaded to failure.
 6. Wall Compressive Strength (Full Geoblock5150 Unit Loaded): 138,240 pound-force (615 kN) when tested using full single unit loaded to failure via flat plate.
 7. Equivalent Elastic Stiffness: 48,000 pound-square inches (140 N-m²) when tested using simply supported Geoblock5150 unit loaded to 1 inch (25 mm) deflection.
 8. Joint Shear Strength: 20,000 pound-force (89.0 kN) when tested using direct shear of tabular connection using special apparatus.
- C. Dimensions:
1. Nominal Width x Length: 20 inches x 40 inches (0.5 m x 1.0 m).
 2. Nominal Depth: 2.0 inches (50 mm).
 3. Nominal Coverage Area: 5.3 square feet (0.5 m²).
 4. Cells per Unit: 72.
 5. Cell Size: 3.1 inches x 3.2 inches (79 mm x 81 mm).
 6. Top Open Area per Unit: 87 percent.
 7. Bottom Open Area per Unit: 41 percent.
 8. Interlocking Offset Tabs: 1 tab for each per peripheral cell. Tab system on all edges of unit.
 9. Nominal Weight per Unit: 8.7 pounds (4.0 kg).
 10. Maximum Unit End-to-End or Side-to-Side Warpage: 0.24 inch (6 mm).
- D. Runoff: Runoff Coefficient at 2.5 inches (63.5 mm) Per Hour Rainfall: .15

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.

3.2 PREPARATION

- A. Subgrade Preparation:

Specifier Notes: Proper subgrade preparation will enable the units to interlock properly and remain stationary after installation.

1. Prepare subgrade as specified in Section 321000. Verify subgrade in accordance with porous paving system manufacturer's instructions.
2. Proper subgrade preparation will enable the Geoblock5150 units to connect properly and remain level and stationary after installation.
3. Excavate area allowing for unit thickness and the engineered base depth (where required).
4. Provide adequate drainage from excavated area if area has potential to collect water, when working with in-place soils that have poor permeability.
5. Ensure in-place soil is relatively dry and free from standing water.
6. Uniformly grade base.

7. Level and clear base of large objects, such as rocks and pieces of wood.

B. 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. Refer to the Geoblock®5150 Design and Construction Overview or consult Presto Geosystems 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 in Section 321000. Verify engineered base (if required) is installed in accordance with porous paving system manufacturer's instructions.
2. Coordinate base installation and preparation with subdrains specified in Section 334600.
3. If required, place a geotextile separation layer between the natural ground and the 'engineered base'.
4. If required, install the specified sub-drain and outlet according to construction drawings.
5. Place engineered base thickness of [6 inches (150 mm)] [4 inches (100 mm)] [2 inches (50 mm)] [_____ inches (_____ mm)].
6. Place engineered base of clear stone or crushed rock, homogenously blended with topsoil.
7. Ensure aggregate portion of base is free from fines and has a known percentage void-space of 30% or greater when compacted. Particle size should range in size from 0.375 to 1.0 inch (9.5 to 25 mm).
8. Add and blend topsoil before placement equal to void percentage in aggregate.
9. Pulverized topsoil portion shall equal plus or minus 25% of the total volume and be added and blended to produce a homogenous mixture prior to placement.
10. Compact the mixture to 95% Standard Proctor.

Specifier Notes: Delete requirement for on-site manufacturer's field representative if not required.

3.3 ON-SITE MANUFACTURER'S FIELD REPRESENTATIVE

- A. A qualified Manufacturer's field representative shall be on-site at the start of construction to observe the installation of the porous pavement system in accordance with the Contract Documents and Manufacturer's recommendations.
- B. The time for on-site observation shall be indicated in the Contract Documents and included in the base bid price.

3.4 INSTALLATION

- A. Install and infill units in accordance with porous paving manufacturer's instructions.
 1. Ensure that all adjacent hard-surfaced paving work is completed before installing the Geoblock5150 porous pavement system.
- B. Installing Units

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

1. Place units with the square hole to the ground.
2. Place units with long direction of unit perpendicular to direction of traffic. [Develop staggered bricklayer pattern by using half units made by field cutting a full unit.] Ensure final seam pattern has seams perpendicular to traffic flow straight and seams parallel to traffic flow staggered.
3. Lay units in the following pattern:
 - a. Install unit pattern as indicated on the drawings.
 - b. Standard running bond bricklayer pattern for access lane applications
 - c. Herringbone pattern for large area with random traffic flow
4. Cut units with a hand or power saw to custom fit contours and around obstructions.

5. Ensure required traffic load transfer and support.
6. Place first row of units against a 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 should 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 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.

Specifier Notes: Anchoring may be required when placing the Geoblock5150 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.

C. Anchoring of Units:

1. Anchor units in-place after installation of all the units within the defined area.
2. Anchor units with 0.5 inch (13 mm) #4 rebar to prevent movement of the units.
3. Anchor length shall be [12.0 inches (305 mm)] [_____ inches (_____ mm)].
4. Drive the anchors through the holes in the Geoblock5150 units along the perimeter as required.

D. Infilling Units – Vegetated Systems:

1. Infill units with a suitable topsoil immediately after units are installed to minimize potential of joint separation.
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. Topsoil: As specified in Section 329200 Manufacturers of Turfs and Grasses.

F. Infilling Units – No Infill

1. If the Geoblock5150 units are to remain unfilled, the inclusion of expansion joints may be recommended for the application.

3.5 DELINEATION

Specifier Notes: With vegetated systems, once healthy turf has been established, the Geoblock5150 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.

A. Delineate the installed Geoblock5150 system with one of the following methods:

1. In-ground curbing
2. Above-ground curbing
3. Shrubbery or vegetation
4. Perimeter lighting
5. Delineation markers
6. _____

3.6 SEED AND GRASSING

A. Finish in accordance with manufacturer's instructions.

B. Seeding:

1. Follow good seeding, fertilizing, and watering procedures for turf establishment based on regional practices as specified in Section 329200 Manufacturers of Turfs and Grasses.
2. Seed shall conform with the requirements of the governing authority for seeding and restrictions on noxious weed seed.

3. Increase watering frequency when free draining base materials are used.

C. Sodding:

Specifier Notes: Specify sod for areas where immediate use is desired.

1. Sweep out topsoil to allow room to seat the sod.
2. Install young sod free from netting materials. The sod should consist of dense, well-rooted growth of permanent and desirable grasses, indigenous to the locality where it will be installed.
3. Press sod into partially emptied cells using a roller or other suitable equipment and follow normal watering procedures.
4. Sodding: As specified in Section 329200 Manufacturers of Turfs and Grasses.

3.7 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 Geoblock5150 wall structure during some operations, but will not effect overall structural integrity of the system.
- C. When snow removal is required, keep a metal edged plow blade a minimum of 1.0 inch (25 mm) above the surface during plowing operations to avoid causing damage to the Geoblock5150 units, or
 1. Use a plow blade with a flexible rubber edge, or
 2. 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