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GEOBLOCK®

GRASS POROUS PAVEMENT SYSTEM

DESIGN & CONSTRUCTION OVERVIEW

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APRIL 2023

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The GEOBLOCK® Porous Pavement System Components

The **GEOBLOCK® Porous Pavement System** provides vehicular and pedestrian load support over grass areas while protecting the grass from the harmful effects of the traffic. The fully developed system has major components as shown in Figure 1.
The components are:

1. the GEOBLOCK unit,
2. the appropriate engineered base material for support,
3. the topsoil infill,
4. the selected vegetation, and
5. steel anchors (if required)

Aggregate-filled systems should utilize the GEOBLOCK porous pavement system.

Other components may include additional geosynthetic separation / reinforcement layer, sub-drain components, and topsoil additives, which enhance vegetative growth.

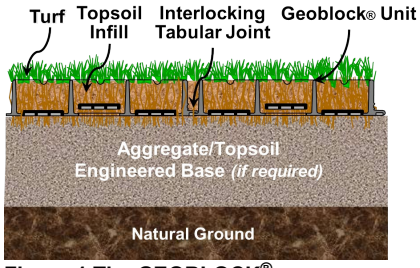


Figure 1 The GEOBLOCK® Porous Pavement System Components

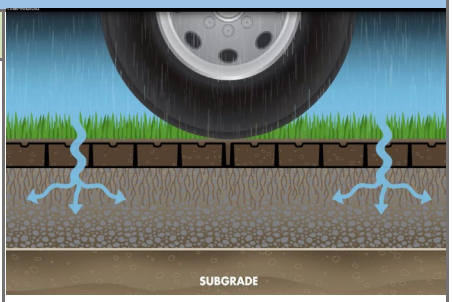
DESIGN Considerations

FUNCTION of the GEOBLOCK System Components

Function of the Grass Paver Structure

The GEOBLOCK units have three key purposes:

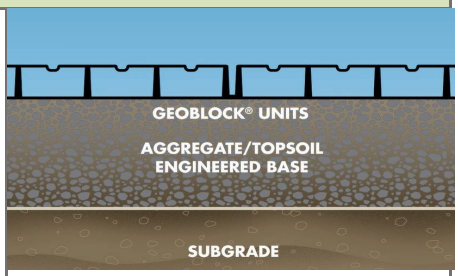
1. to adequately support and dissipate the design loads (up to AASHTO H/HS-25 loading).
2. to provide permeability and infiltration of rainwater.
3. to provide a healthy environment for the topsoil infill and vegetative cover.
4. The GEOBLOCK pavers are semi-rigid pavers with interconnected cell walls, and a tabular connection between paver units. This interconnection offers a high load distribution allowing for less supporting base material than many lighter-weight or rolled systems.



Function of the Engineered Base

For a given applied load over an existing subbase soil, both the *engineered base* and the GEOBLOCK unit provide support. The depth of the *engineered base* should be determined using both loading and subbase strength.

The ***engineered base*** consists of an open-graded aggregate and topsoil. The aggregate portion, once compacted, provides structural support for the load and the topsoil portion provides a healthy growing medium for the vegetation.

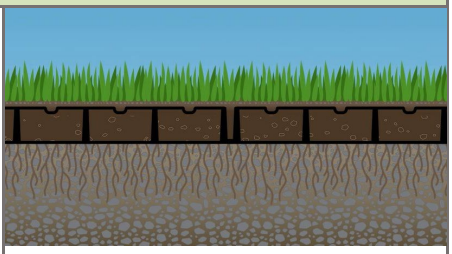


Function of the Topsoil Infill & Vegetation

The topsoil infill placed within the cells of the GEOBLOCK unit provides a nourishing medium for development of a healthy root system for the vegetative cover. The infill determines the permeability and controls the rate of water infiltration within the GEOBLOCK layer, so the topsoil should be a good quality, drainable soil.

If climatic conditions are such where prolonged periods of dryness exist, moisture retention additives within the topsoil may be appropriate.

The completed system should provide a healthy and aesthetically pleasing vegetative cover. Vegetation type should be selected by a qualified agronomist and be resilient enough to withstand anticipated load frequencies. Heat and automotive fluids from excessive traffic can over-stress any vegetative cover resulting in periodic maintenance. In all cases, proper fertilizing, watering, thatch removal, and aeration is a must for healthy vegetation.



OPTIONAL Components

Geosynthetic Layer (if required)

Under some conditions, a geosynthetic layer may be a required component between the sub grade and required *engineered base* in the porous pavement system. Generally, the geosynthetic component will serve one or more of the following functions and be one or more of the following materials: 1) Tensile Reinforcement (Woven Geotextiles), 2) Separation (Non-Woven Geotextiles) and 3) Drainage / Separation Geosynthetics (Geonets, piping).

Sub-drain Component (if required)

If the GEOBLOCK units are installed over non-porous soils and an excavation is required such that water could be trapped, sub drainage becomes a required component of the system. Sub-drainage will remove harmful water accumulation that will cause degradation of the in-situ soils resulting in loss of support capacity

SPECIFICATION Details:

Material Properties & Unit Dimensions

GEOBLOCK units shall be made from materials with physical and chemical characteristics described in Table 1. The manufactured GEOBLOCK units shall have a minimum deflection without breakage of 1.0 in (25 mm) when units are supported at 1.64 ft (0.50 m) centers at 70°F (21°C). The color shall be uniform through all units in any given pallet.

GEOBLOCK units shall have physical dimensions as specified in Table 1 and shown in Figure 2. GEOBLOCK units shall have an interlocking offset tab system on all edges as detailed in both Figures 2 and 3. End-to-end or side-to-side warpage of the GEOBLOCK units shall not be greater than 0.25 in (6 mm).

Table 1 SPECIFICATION of the GEOBLOCK® Porous Pavement Unit

Item	Specification & Details
Material	Up to 100% Recycled Polyethylene*
Color	Ranges Dark Shades Gray to Black
Chemical Resistance	Superior
Carbon Black for Ultraviolet Light Stabilization	1.5% - 2.0%
Unit Minimum Crush Strength (Empty) @ 70°F (21°C)	420 psi (2,900 kPa)
Unit Minimum Crush Strength (Sand-Filled) @ 70°F (21°C)	5,980 psi (41,285 kPa)
Flexural Modulus @ 70°F (21°C)	35,000 psi (240,000 kPa)
Nominal Dimensions (width x length)	20 in x 40 in (0.5 m x 1.0 m)
Nominal Unit Depth	1.2 in (30 mm)
Nominal Coverage Area	5.3 ft² (0.5 m²)
Cells per Unit	128
Cell Size	2.25 in x 2.25 in (57 mm x 57 mm)
Top Open Area per Unit	88%
Bottom Open Area per Unit	56%
Weight per Unit (nominal)	4.7 lb (2.1 kg)
Runoff Coefficient @ 2.5 in/hr (64 mm/hr) Rainfall	0.15
Units per Pallet	92

Paver Unit Details

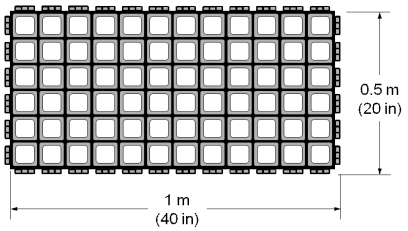


Figure 2 GEOBLOCK Unit Nominal Dimensions

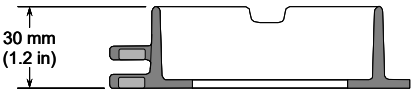


Figure 3 GEOBLOCK Cell and Interlocking Offset Tab

- * The percentage of recycled content may vary depending on availability of recycled materials.
- Dimensions and weight are subject to manufacturing tolerances and are influenced by recycled components.
- End-to-end or side-to-side warp of the GEOBLOCK unit shall not be greater than 0.5 in (6 mm).
- Avoid specifications that state material compressive strength only. Material compressive strength, with applied factors of safety, must be sufficient to resist compressive and lateral loads. In addition, ultra-high compressive strength adds little value to a porous pavement system.

Engineered BASE Material

The recommended ***'engineered base'*** is a homogenous mixture consisting of 1) an open graded crushed aggregate having an AASHTO # 5 or similar designation blended with 2) pulverized topsoil and 3) a void component generally containing air and/or water. This homogenous mixture will promote vegetative growth and provide required structural support. See *Function of the Engineered Base* for details.

The aggregate portion shall have a particle range from 0.375 to 1.0 in (9.5 mm to 25 mm) with a D_{50} of 0.5 in (13 mm). The percentage void-space of the aggregate portion when compacted shall be at least 30%. The pulverized topsoil portion shall equal 33% +/- of the total volume and be added and blended to produce a homogenous mixture prior to placement. Once placed, the mixture shall be compacted to the Engineer's specifications.

Under some conditions, a geotextile separation layer may be required between the natural ground and the engineered base. The edges of the base shall be constrained appropriately.

Table 2: Engineered Base Depth Recommendations for the GEOBLOCK® Unit
The Engineer shall be responsible for the design and stability of the aggregate base and edges.

Load Description[1]	***Depth of Engineered Base***	
	CBR 2 – 4[1]	***CBR > 4[1]***
Heavy Fire Truck Access & H/HS-25, H/HS-20 loading. Typical 110 psi (758 kPa) maximum tire pressure. Single axle loadings of 40 kips (178 kN), tandem axle loadings of 48 kip (220 kN). Gross vehicle loads of 90,000 lbs (40.1 MT). Infrequent passes[2].	8 in (200 mm)	6 in (150 mm)
Light Fire Truck Access & H/HS-15 loading. Typical 85 psi (586 kPa) maximum tire pressure. Single axle loadings of 24 kips (110 kN). Gross vehicle loads of 60,000 lb (27.2 MT). Infrequent passes[2].	6 in (150 mm)	4 in (100 mm)
Utility & Delivery Truck Access & H/HS-10 loading. Typical 60 psi (414 kPa) maximum tire pressure. Single axle loadings of 16 kips (75 kN). Gross vehicle loads of 40,000 lbs (18.1 MT). Infrequent passes[2].	4 in (100 mm)	4 in (100 mm)
Cars & Pick-up Truck Access. Typical 45 psi (310 kPa) maximum tire pressure. Single axle loadings of 4 kips (18 kN). Gross vehicle loads of 8,000 lbs (3.6 MT). Infrequent passes[2].	2 in (50 mm)	2 in (50 mm)
Trail Use. Loading for pedestrian, wheelchair, equestrian, bicycle, motorcycle and ATV traffic.	2 in (50 mm)	2 in (50 mm)

[1] The GEOBLOCK system can be applied in areas where loading is greater than those listed above. In these situations, call Presto Geosystems or an authorized Presto Geosystems' representative for specific recommendations.

[2] Infrequent passes are defined as the number of passes over any period of time that causes no lasting damage to the vegetation. This number will be a function of vegetation type and age, climatic conditions, and maintenance practices. This number is not a function of the GEOBLOCK material.

Topsoil Infill

The topsoil should be a good quality, drainable soil and not be compacted within the units as infill determines the permeability and controls the rate of water infiltration within the paver system.

If weather conditions are such where prolonged periods of dryness exist, watering or moisture retention additives within the topsoil may be appropriate.

Design Considerations for System Structural Integrity

Elements Important to Structural Integrity

The GEOBLOCK unit (or any other similar paver system) must have five primary characteristics to adequately support load as shown below:

1) **SUITABLE WALL STRENGTH:** The wall strength must support wheel loading from the heaviest anticipated vehicles that will travel over the porous pavement system. Vehicular loading will create direct wall compression from tires and equipment outriggers as well as lateral forces from vehicle breaking and acceleration. The wall should resist vertical and lateral deformations when loaded. **Caution** should be exercised when using systems with thin walls.
2) **SUFFICIENT UNIT STIFFNESS:** The unit stiffness must allow deflections without unit breakage or separation when subbase soils yield under loading. When the unit is too flexible, the base soils support the complete load. When the unit is too rigid, it could break under normal loading in low temperature conditions. **Caution** should be exercised when using systems that are either too flexible or too rigid.
3) **SIGNIFICANT JOINT STRENGTH:** The strength of the joint must transfer load from unit to unit while staying engaged under normal deflections. Some deflection should be expected due to the physical characteristics of plastics and soils. High joint shear-strength causes greater load dissipation resulting in lower pressure on the base and subbase soils. If the joint has inadequate shear-strength, load support will occur through each unit causing the unit to act independently. **Caution** should be exercised when using systems that have little or no physical material in the joint.
4) **SUPPORTING BASE:** The unit support base must have sufficient edge restraints and a large enough area-of-contact with the base soil so high wheel loads at the top of the unit are reduced sufficiently when transferred to the base soil. This will provide a system with a greater range of stability. **Caution** should be exercised when using systems that have little contact area between the porous pavement unit and the base soil.
5) **LARGE OVERALL AREA**: A large overall area, in conjunction with the other characteristics, ensures maximum load dissipation. If unit separation should occur and any given unit functions independently, larger unit areas will lower the pressure on base and subgrade soils. **Caution** should be exercised when using systems that have smaller contact areas.

Elements Not Important to Structural Integrity

Avoid specifications that state material compressive strength only. Material compressive strength, with applied factors-of-safety, must be sufficient to resist compressive and lateral load application. Beyond that, ultra-high material compressive strengths add little to the porous pavement system.

Table 3 STRENGTH Characteristics of the GEOBLOCK® Unit

Test	Value
Wall Compressive Strength (simulated tire area loaded) Test Procedure - Circular plate, 6.5 in (165 mm) diameter, loaded to failure	420 psi (2,900 kPa)
Wall Compressive Strength (full GEOBLOCK unit loaded) Test Procedure - Full single unit loaded to failure via flat plate	138,240 lbf (615 kN)
Equivalent Elastic Stiffness Test Procedure - Simply supported GEOBLOCK unit loaded to1 in (25 mm) deflection	48,000 lb-in² (140 N-m²)
Joint Shear Strength Test Procedure - Direct shear of tongue-and-groove using special apparatus (See **NOTE**)	20,000 lbf (89.0 kN)
NOTE: All tests were conducted by Bathurst, Jarrett and Associates Inc. at the Royal Military College in Kingston, Ontario, Canada on the wall of a different GEOBLOCK unit with an equivalent wall.	

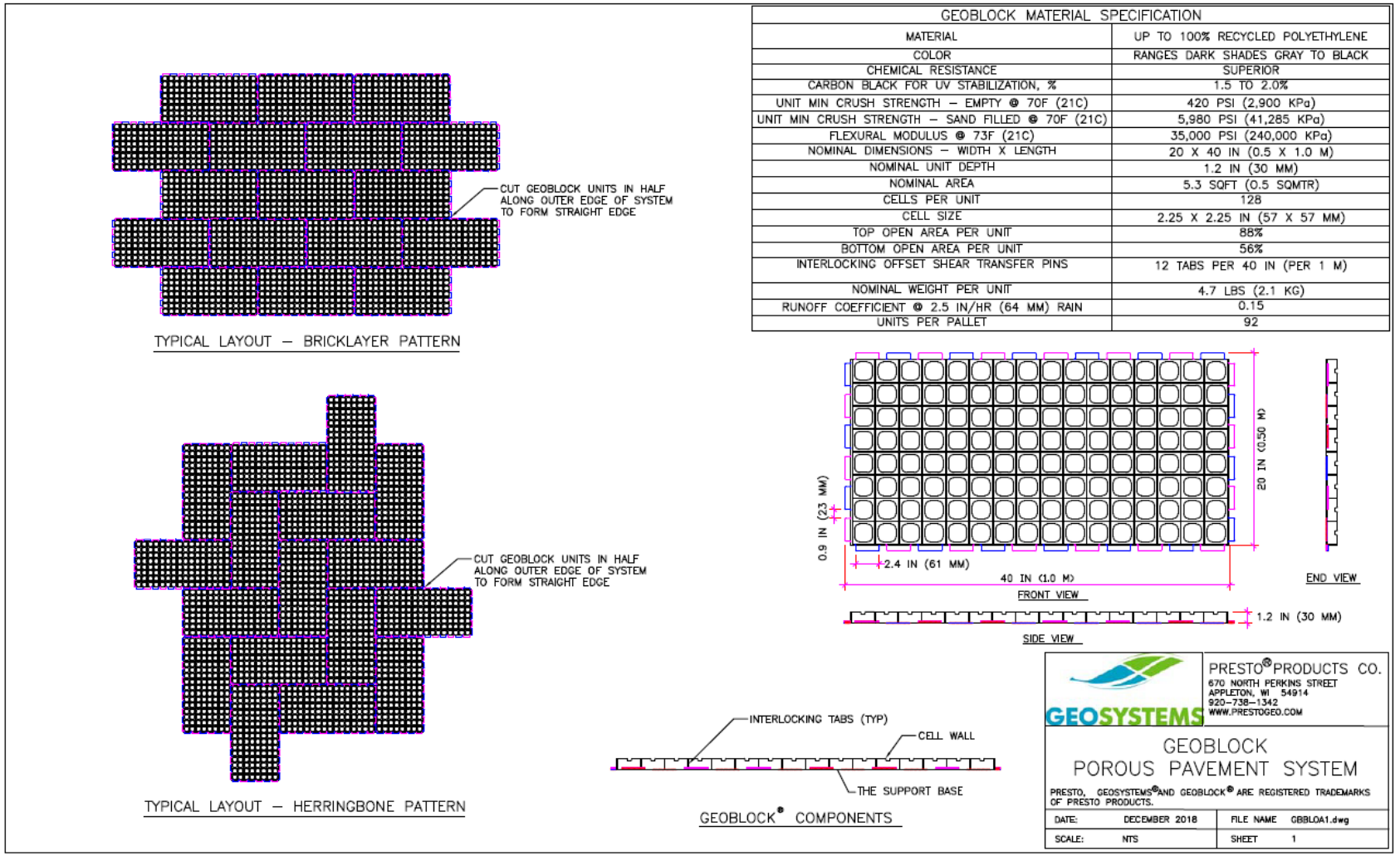
Elements Important to the Vegetation

The GEOBLOCK unit provides an environment for maintaining healthy vegetative cover by preventing loads from excessively damaging the vegetative cover through compaction of the topsoil layer. The wall system has the strength and spacing needed to support any tire loading from influencing the topsoil layer. The open area in the bottom of the GEOBLOCK unit allows water and nutrients to pass through the soil layers. The GEOBLOCK unit alone will not ensure healthy vegetation. Vegetation must grow in un-compacted soil and receive adequate water and nutrients to remain healthy.

Engineer Specification Checklist

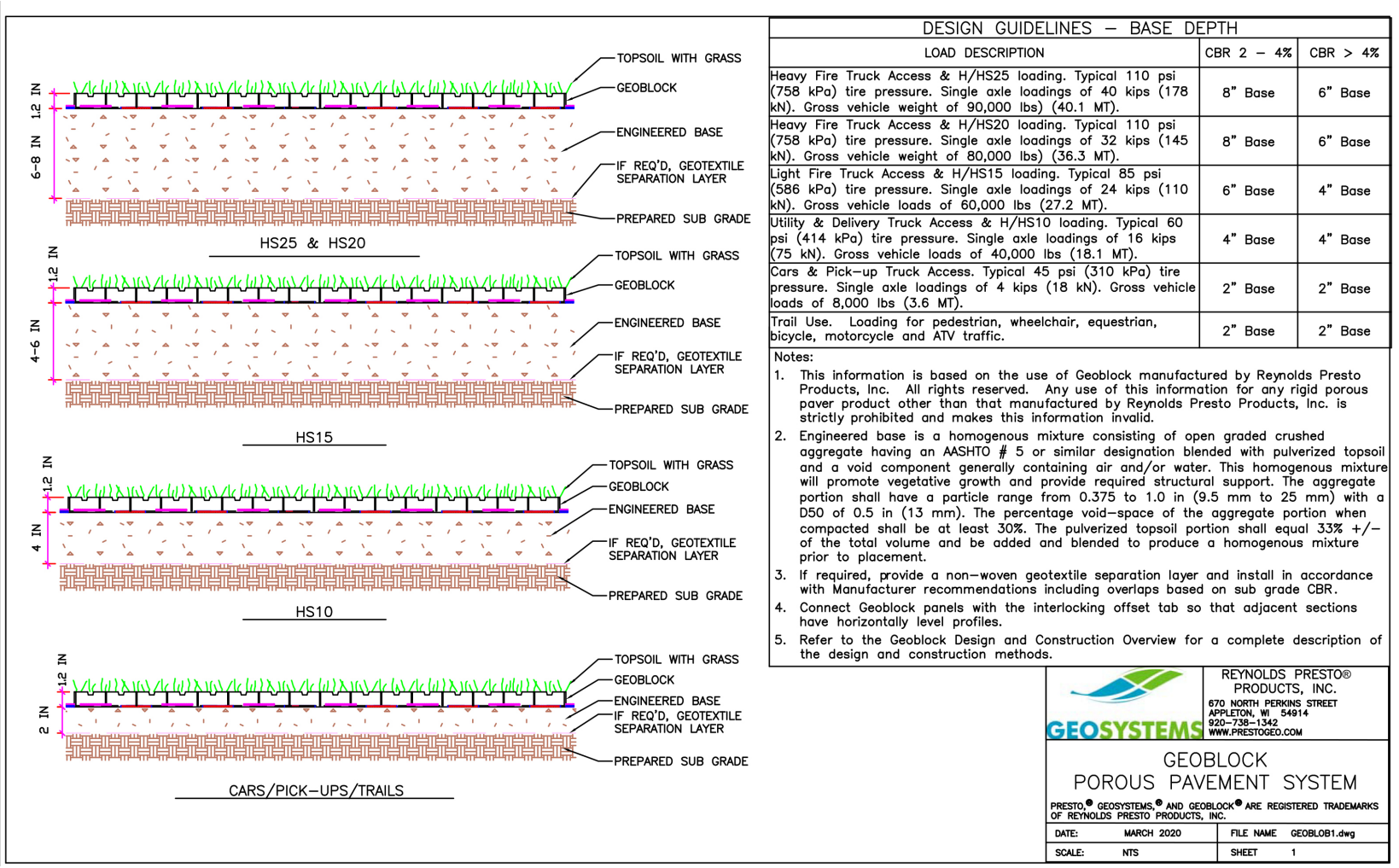
The Engineer shall specify the following:

Specification Item	Description
Paver Unit	Specify GEOBLOCK Porous Pavement System
Optional Layers	Specify Geosynthetic Layer or Subdrain Component if required
Paver Unit Orientation	Specify Bricklayer or Herringbone Pattern depending on traffic type & flow.
Connection & Anchorage of Paver Units	Specify connection of paver units with thread-forming tapping screws through the interlocking tabs on the perimeter units. If required for slope applications, specify anchoring with stakes through the perimeter units.
Engineered Base Material	Specify: The recommended ***'engineered base'*** is a homogenous mixture consisting of 1) an open-graded crushed aggregate having an AASHTO #5 or similar designation blended with 2) pulverized topsoil and 3) a void component generally containing air and/or water. This homogenous mixture will promote vegetative growth and provide required structural support. See *Function of the Engineered Base* for details. The aggregate portion shall have a particle range from 0.375 to 1.0 in (9.5 mm to 25 mm) with a D_{50} of 0.5 in (13 mm). The percentage void-space of the aggregate portion when compacted shall be at least 30%. The pulverized topsoil portion shall equal 33% +/- of the total volume and be added and blended to produce a homogenous mixture prior to placement. Once placed, the mixture shall be compacted to the Engineer's specifications.
Engineered Base Depth	Specify depth of engineered base (inches, millimeters) depending on loading, frequency and sub grade CBR value.
Infill	Specify: The topsoil should be a good quality, drainable soil and not be compacted within the unit as the infill determines the permeability and controls the rate of water infiltration within the porous pavement system. If climatic conditions are such where prolonged periods of dryness exist, moisture retention additives within the topsoil may be appropriate.
Vegetation	Specify Seed or Sod. For both, specify sweeping out the infill to create a meniscus layer within the cells and to follow water and fertilizing procedures for turf establishment and regional practices. For Sod: Specify a young sod free from netting material.
Delineation	Specify a delineation method such as above-ground curbing, shrubbery, perimeter lighting or delineation markers.
SPECMaker® Specification Development Tool	Presto's SPECMaker® Tool is a quick, easy online resource to make customizable, 3-part GEOBLOCK specifications. Click for the SPECMaker Program



GEOBLOCK MATERIAL SPECIFICATION	
MATERIAL	UP TO 100% RECYCLED POLYETHYLENE
COLOR	RANGES DARK SHADES GRAY TO BLACK
CHEMICAL RESISTANCE	SUPERIOR
CARBON BLACK FOR UV STABILIZATION, %	1.5 TO 2.0%
UNIT MIN CRUSH STRENGTH – EMPTY @ 70F (21C)	420 PSI (2,900 KPa)
UNIT MIN CRUSH STRENGTH – SAND FILLED @ 70F (21C)	5,980 PSI (41,285 KPa)
FLEXURAL MODULUS @ 73F (21C)	35,000 PSI (240,000 KPa)
NOMINAL DIMENSIONS – WIDTH X LENGTH	20 X 40 IN (0.5 X 1.0 M)
NOMINAL UNIT DEPTH	1.2 IN (30 MM)
NOMINAL AREA	5.3 SQFT (0.5 SQMTR)
CELLS PER UNIT	128
CELL SIZE	2.25 X 2.25 IN (57 X 57 MM)
TOP OPEN AREA PER UNIT	88%
BOTTOM OPEN AREA PER UNIT	56%
INTERLOCKING OFFSET SHEAR TRANSFER PINS	12 TABS PER 40 IN (PER 1 M)
NOMINAL WEIGHT PER UNIT	4.7 LBS (2.1 KG)
RUNOFF COEFFICIENT @ 2.5 IN/HR (64 MM) RAIN	0.15
UNITS PER PALLET	92

Figure 4 GEOBLOCK® System Material Specification and Layout



DESIGN GUIDELINES – BASE DEPTH

LOAD DESCRIPTION	CBR 2 – 4%	CBR > 4%
Heavy Fire Truck Access & H/HS25 loading. Typical 110 psi (758 kPa) tire pressure. Single axle loadings of 40 kips (178 kN). Gross vehicle weight of 90,000 lbs) (40.1 MT).	8" Base	6" Base
Heavy Fire Truck Access & H/HS20 loading. Typical 110 psi (758 kPa) tire pressure. Single axle loadings of 32 kips (145 kN). Gross vehicle weight of 80,000 lbs) (36.3 MT).	8" Base	6" Base
Light Fire Truck Access & H/HS15 loading. Typical 85 psi (586 kPa) tire pressure. Single axle loadings of 24 kips (110 kN). Gross vehicle loads of 60,000 lbs (27.2 MT).	6" Base	4" Base
Utility & Delivery Truck Access & H/HS10 loading. Typical 60 psi (414 kPa) tire pressure. Single axle loadings of 16 kips (75 kN). Gross vehicle loads of 40,000 lbs (18.1 MT).	4" Base	4" Base
Cars & Pick–up Truck Access. Typical 45 psi (310 kPa) tire pressure. Single axle loadings of 4 kips (18 kN). Gross vehicle loads of 8,000 lbs (3.6 MT).	2" Base	2" Base
Trail Use. Loading for pedestrian, wheelchair, equestrian, bicycle, motorcycle and ATV traffic.	2" Base	2" Base

Notes:

1. This information is based on the use of Geoblock manufactured by Reynolds Presto Products, Inc. All rights reserved. Any use of this information for any rigid porous paver product other than that manufactured by Reynolds Presto Products, Inc. is strictly prohibited and makes this information invalid.
2. Engineered base is a homogenous mixture consisting of open graded crushed aggregate having an AASHTO # 5 or similar designation blended with pulverized topsoil and a void component generally containing air and/or water. This homogenous mixture will promote vegetative growth and provide required structural support. The aggregate portion shall have a particle range from 0.375 to 1.0 in (9.5 mm to 25 mm) with a D50 of 0.5 in (13 mm). The percentage void–space of the aggregate portion when compacted shall be at least 30%. The pulverized topsoil portion shall equal 33% +/– of the total volume and be added and blended to produce a homogenous mixture prior to placement.
3. If required, provide a non–woven geotextile separation layer and install in accordance with Manufacturer recommendations including overlaps based on sub grade CBR.
4. Connect Geoblock panels with the interlocking offset tab so that adjacent sections have horizontally level profiles.
5. Refer to the Geoblock Design and Construction Overview for a complete description of the design and construction methods.

GEOSYSTEMS

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GEOBLOCK
POROUS PAVEMENT SYSTEM

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Figure 5 GEOBLOCK® System Usage Guideline

Installing the GEOBLOCK® System

Prepare the Subgrade

Excavate the area, allowing for the GEOBLOCK unit thickness and the base depth (where base material is required).

- When working with a subgrade that has poor permeability, provide adequate drainage from the excavated area if there is the potential to collect water.
- The subgrade should be relatively dry and free from any standing water.

Finish-grade the surface of the subgrade specifically when the GEOBLOCK unit is to be installed without additional base material. Level and clear the area of large objects such as rocks, pieces of wood, etc. to enable the GEOBLOCK units to connect properly and remain stationary after installation.

The sub grade shall be compacted to the Engineer's specifications. Caution should be exercised to ensure that the porous subbase not be over compacted such that porosity is hindered.

Install Optional Components (if specified)

Geosynthetic Separation Layer (if specified)

If required and/or specified by the project engineer, the geosynthetic layer shall be rolled out over the prepared subgrade along the alignment in the direction of traffic. The geosynthetic shall be pulled taut to ensure that there are no folds. The geotextile shall be installed in accordance with Manufacturer recommendations, including overlaps.

Sub-Drainage Component (if specified)

If required and/or specified by the project engineer, install the specified geonet, sub-drain and outlet piping according to construction drawings. Ensure that a proper slope is maintained throughout the drainage system and that the outlet is free from any obstructions preventing free drainage.

Prepare the Engineered Base

If required, install the specified Engineered Base material over the prepared sub grade, compact to the Engineer of Record's specifications and fine grade as appropriate. *Refer to "Engineered Base Material" section for a description of engineered bases.*

The Engineered Base shall be compacted to the Engineer's specifications. The edges of the Engineered Base must be constrained to prevent movement. Engineered Base depth shall be per Engineer's specification. The Engineer shall be responsible for the design and stability of the Engineered Base course. Reference Table 2 Engineered Base Depth Recommendations.

Install the GEOBLOCK Units

Orientation & Laying Pattern of Units

Place the GEOBLOCK units with the square hole to the ground.

Install unit pattern as indicated on the Drawings. Recommended laying patterns are illustrated in **Figure 6** and **7**.

BRICKLAYER PATTERN:

When the application is a **one-direction access lane,** stagger the units to produce the **bricklayer pattern**. The pattern is positioned such that the long direction of the unit is perpendicular to the primary direction of traffic. **See Figure 6.**

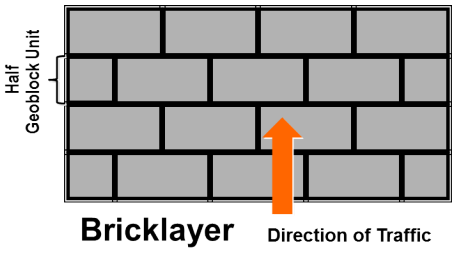

Figure 6 Bricklayer Laying Pattern

HERRINGBONE PATTERN:

When the application is a **large area with multi-directional traffic**, stagger the units to produce the **herringbone pattern.** This pattern reduces straight seams to one and a half block lengths. **See Figure 7**.

The staggered pattern is developed by using half GEOBLOCK units made by field cutting a full unit and placing the units as illustrated. Cut the units with a hand or power saw to custom fit both contours and/or around obstructions. These final seam patterns assure maximum load transfer and support.

Other laying patterns are generally not recommended.

Positioning of Units

Place the first row of GEOBLOCK units against a stationary edge when available. If the units are placed between two perpendicular or near-perpendicular stationary edges (i.e. two parallel concrete curbs) allow for potential thermal expansion of the GEOBLOCK units by keeping the units away from the stationary edge.

Slide the units together so that the interlocking tab joint is fully engaged as illustrated in **Figure 8**.

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.

Fixing Units in Place

If construction traffic may cause shifting of the GEOBLOCK units during installation, use one of the following methods:

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. Consult Presto Geosystems for details.

Anchoring Units

If staking is used to prevent movement during and after installation, the user shall determine if stakes shall be temporary or permanent and select the appropriate stake material. If anchoring is required, place anchors after installation of all of the GEOBLOCK units within the defined area. To prevent movement of the units, anchor with 0.5 inch (13 mm) #4 rebar or wood stakes.

Typical anchor length is 12 inches (300 mm) or as specified by the Engineer.

Drive the anchors through the holes in the GEOBLOCK units along the perimeter as required.

Figure 9 illustrates some of the anchoring possibilities.

Thermal Expansion

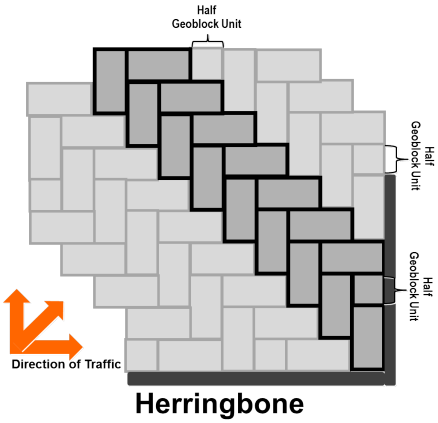

Figure 7 Herringbone Laying Pattern

Figure 8 The Interlocking Tab Joint

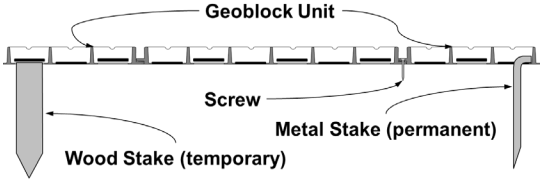

Figure 9 Anchoring Possibilities

NOTE: The GEOBLOCK polyethylene stabilized with carbon black and has a relatively high rate of thermal expansion. Joint separation occurring from large temperature fluctuations is normal. Therefore, rejoining of the GEOBLOCK units should be considered normal construction practice.

The GEOBLOCK polyethylene stabilized with carbon black has a relatively high rate of thermal conductivity and thermal expansion. The rate of thermal expansion is approximately 1.7% per 100 ºF (55 ºC). Based on the temperature of the GEOBLOCK unit exposed to full sunlight for several hours, a temperature gain of 60-70 ºF (33-38 ºC) is typical. As a result, a compensation of 1.375 in (34 mm) could be applied for each 10 ft (3 m) increment of length. When the installation day(s) is optional, install the GEOBLOCK units on cooler cloudy days as opposed to hot sunny days.

Once infilled, thermal expansion is minimized. Once the root system is fully developed, the vegetation provides all necessary anchoring of the system.

Infill the GEOBLOCK Unit

Infill the GEOBLOCK units with a suitable topsoil. The topsoil should be a good quality, drainable soil and not be compacted within the GEOBLOCK unit. Use spreading methods that will leave the cell infill un-compacted.

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 as shown in Figure 10. Final topsoil placement should be slightly below the level of the GEOBLOCK cell wall.

If the final vegetation is sod, underfill by sod depth to allow room to seat or press the sod into the GEOBLOCK units.

Overfilling the cells is not recommended since vehicular loading will cause undesirable compaction of the topsoil. Infilling should take place immediately after the units are installed to minimize the potential of joint separation or upward buckling caused by thermal expansion/contraction.

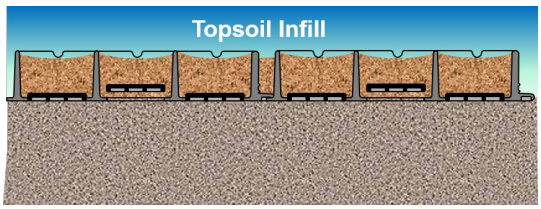

Figure 10 Sweep out topsoil infill

Apply Vegetation and Finishing Procedures

Seeding

Use seed mix as shown on the Drawings or as specified in the Contract Documents. Follow seeding, fertilizing, and watering procedures for turf establishment based on regional practices. Seed mix shall conform to the requirements of the governing authority for seeding and restrictions on noxious weed seed.

Sod Application

Sod can be used for areas where immediate vegetation is desired. Young sod that is free from netting materials is recommended. Mature sod with a more developed root system and sod with netting may be difficult to press/cut into the GEOBLOCK cells. When sod is used:

- Aggressively sweep out the topsoil from the GEOBLOCK unit to allow room to seat or press the sod into the unit. **Enough topsoil must be removed so that the crown of the sod is recessed slightly below the top of the cell after pressing the sod in place.** If too much topsoil is removed, the bottom of the sod will not make contact with the topsoil after it is pressed into the cell. Avoid removing too much topsoil.
- Place the sod per typical practices.
- Press the sod into the partially emptied GEOBLOCK cells using a roller or other suitable equipment.
- Follow recommended watering procedures to ensure healthy sod growth.

Above Ground, Post-Installation Delineation

Once healthy turf has been established and good turf maintenance practices are followed, the GEOBLOCK cell wall structure will have minimal visibility. If used for lanes, delineation may be desirable to create greater visibility. Delineation methods can include the following: above-ground curbing, shrubbery or vegetation, perimeter lighting or delineation markers.

Maintenance

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.

Snow Removal

When snow removal is required, keep a metal edged plow blade from coming in contact with the surface during plowing operations to avoid causing damage to the GEOBLOCK units. Remove snow by using one of the following basic procedures:

- Keep a metal edged plow blade a minimum of 1.0 inch (25 mm) above the surface during plowing operations
- Use a plow blade with a flexible rubber edge
- Use a plow blade with skids on the lower outside corners so the plow blade does not come in contact with the units.

Limited Warranty

Presto Geosystems warrants each GEOBLOCK 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.

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 GEOBLOCK 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 GEOBLOCK system. Contact Presto Products Co. Ph: 800-548-3424; 920-738-1328, or Email info@prestogeo.com.

Disclaimer

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Project specifications take precedence over all manufacturers' recommendations.