PRESTO GEOSYSTEMS

GEOBLOCK

GEOBLOCK®5150

POROUS PAVEMENT SYSTEM

DESIGN & CONSTRUCTION OVERVIEW

PRESTO GEOSYSTEMS

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The Geoblock®5150 Porous Pavement System Components

The Geoblock®5150 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 four major components (see Figure 1). The components are

(1) the Geoblock unit,
(2) the *engineered base* for support (if required),
(3) the selected topsoil infill, and
(4) the selected vegetation.

Both the Geoblock unit and the base support soil work together to support the imposed loading. Both the Geoblock unit and the topsoil contribute to the vegetation support. A review of the four major components follows.

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

Aggregate-filled systems should utilize the Presto GeoPave™ porous pavement system.

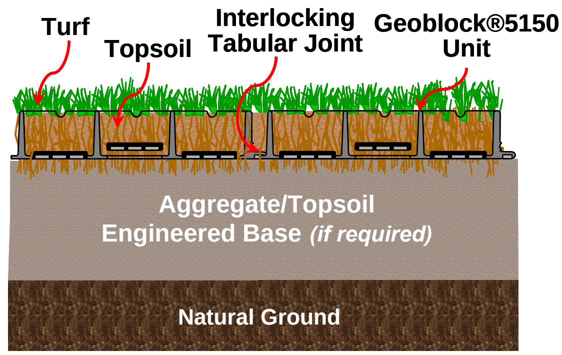

Figure 1 The Geoblock5150 Porous Pavement System Components

Function of the Geoblock Unit

The Geoblock unit has two basic purposes:

1. to adequately support and dissipate the design loads over a worst-case soil scenario and
2. to provide a healthy environment for the vegetative cover.

An example of a worst-case scenario might be a large fire truck, responding to an alarm, and passing over a rain-soaked porous pavement system to reach an area of a building containing people.

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* is comprised of an open-graded aggregate and topsoil. The aggregate portion, once compacted, provides support for the load and the topsoil portion provides support for the vegetation. With a proper mixture, over compaction of the aggregate portion should not cause over compaction of the topsoil portion. The uncompacted topsoil component allows for sufficient air voids, water percolation and root penetration. However, excessive topsoil will compact and not allow for healthy vegetation. See **Engineered Base Preparation** under **Installing the Geoblock System** for additional details.

Function of the Topsoil Infill

The topsoil infill placed within the cells of the Geoblock unit must provide a nourishing medium for development of a healthy root system for the vegetative cover. The topsoil should be a good quality, drainable soil and not be compacted within the Geoblock unit. When used as a porous pavement system, the infill determines the permeability and controls the rate of water infiltration within the Geoblock layer. If climatic conditions are such where prolonged periods of dryness exist, moisture retention additives within the topsoil may be appropriate. Final topsoil placement should be at or slightly below the level of the Geoblock cell wall. See **Infilling the Geoblock Unit** under **Installing the Geoblock System** for additional details.

Function of the Vegetation

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. See **Finishing Procedures** under **Installing the Geoblock System** for additional details.

Function of the Geosynthetic Layer

Under some conditions, a geosynthetic layer may be a required component between the in-situ soil and the 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:

- Tensile Reinforcement Geosynthetics: .... Woven geotextiles, Geogrids
- Separation Geosynthetics: .... Non-woven geotextiles, Woven geotextiles,
- Drainage / Separation Geosynthetics: .... Non-woven geotextiles, Geonet / geotextile separation / drainage materials

See **Geosynthetic Separation Layer** under **Installing the Geoblock System** for additional details.

Function of the Sub-drain Component

If the porous pavement system is built 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. See **Sub-Drainage Component** under **Installing the Geoblock System** for additional details.

Material Properties & Unit Dimensions

Geoblock units shall be made from materials with physical and chemical characteristics described in Table 1. The manufactured Geoblock unit shall have a minimum deflection without breakage of 25 mm (1.0 in) when units are supported at 0.50 m (1.64 ft) centers at 21°C (70°F). The color shall be uniform throughout 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 Figure 2 and Figure 3. End-to-end or side-to-side warpage of the Geoblock unit shall not be greater than 6 mm (0.25 in).

Table 1 Geoblock®5150 Porous Pavement Unit

Item	Specifications & Details
Material	Up to 97% Recycled Polyethylene*
Color	Ranges from dark shades of gray to black
Chemical Resistance	Superior
Carbon Black for Ultraviolet Light Stabilization	1.5% - 2.0%
Unit Minimum Crush Strength @ 21°C (70°F)	2,900 kPa (420 psi)
Material Flexural Modulus at 23°C (73°F)	240,000 kPa (35,000 psi)
Nominal Dimensions (width x length)	0.50 m x 1.00 m (20 in x 40 in)
Nominal Unit Depth	50 mm (2 in)
Nominal Coverage Area	0.50 m² (5.38 ft²)
Cells per Unit	72
Cell Size	79 mm x 81 mm (3.1 in x 3.2 in)
Top Open Area per unit	87%
Bottom Open Area per unit	41%
Interlocking offset tabs	12 tabs per meter (40 in)
Nominal Weight per Unit	4.0 kg (9.0 lb)
Runoff Coefficient @ 63.5 mm/hr (2.5 in) Rainfall	(.15)
Units per Pallet	50

* The percentage of recycled content may vary depending on availability of recycled materials.

NOTE: Dimensions and weight are subject to manufacturing tolerances and are influenced by recycled component characteristics.

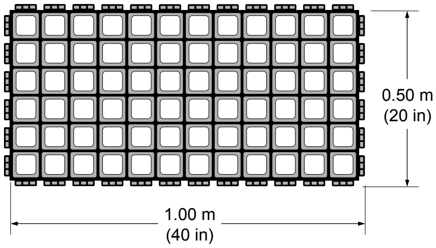

Figure 2 The Geoblock5150 Unit

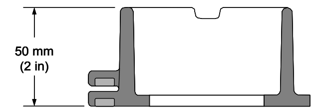

Figure 3 The Geoblock Cell and Interlocking Offset Tab

Table 2 Design Guideline: Base Recommendations

Load Description[1]	***Depth of Engineered Base***	
	CBR[2] ***2 – 4***[3]	***CBR***[2] ***> 4***[3]
Heavy Fire Truck Access & H-20 loading. Typical 758 kPa (110 psi) maximum tire pressure. Single axle loadings of 145 kN (32 kip), tandem axle loadings of 220 kN (48 kip). Gross vehicle loads of 36.3 tonne (80,000 lb). Infrequent passes[4].	150 mm (6 in)	100 mm (4 in)
Light Fire Truck Access & H-15 loading. Typical 586 kPa (85 psi) maximum tire pressure. Single axle loadings of 110 kN (24 kip). Gross vehicle loads of 27.2 tonne (60,000 lb). Infrequent passes[4].	100 mm (4 in)	50 mm (2 in)
Utility & Delivery Truck Access & H-10 loading. Typical 414 kPa (60 psi) maximum tire pressure. Single axle loadings of 75 kN (16 kip). Gross vehicle loads of 18.1 tonne (40,000 lb). Infrequent passes[4].	50 mm (2 in)	50 mm (2 in)
Cars & Pick-up Truck Access. Typical 310 kPa (45 psi) maximum tire pressure. Single axle loadings of 18 kN (4 kip). Gross vehicle loads of 3.6 tonne (8,000 lb). Infrequent passes[4].	None	None
Trail Use. Loading for pedestrian, wheelchair, equestrian, bicycle, motorcycle and ATV traffic.	None	None

[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] CBR is the abbreviation for California Bearing Ratio. Methods for determining CBR vary from more sophisticated laboratory methods to simple field identification methods that use hand manipulation of the soil. Presto does not recommend one method over the other, however, the user must have a high degree of confidence in the results produced by the chosen method.

[3] If other-than-CBR soil strength values exist, use available correlation charts to relate the value to CBR.

[4] Infrequent passes is 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.

The Engineered Base (if required)

A recommended *'engineered base'* is a homogenous mixture consisting of 1) a clear-stone / crushed rock 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 9.5 mm to 25 mm (0.375 to 1.0 in) with a D_{50} of 13 mm (0.5 in). The percentage void-space of the aggregate portion when compacted shall be at least 30%. The pulverized topsoil portion shall equal 25% +/- of the total volume and be added and blended to produce a homogenous mixture prior to placement or washed into the in-place compacted aggregate. Once placed, the mixture shall be compacted to 95% Standard Proctor Density.

Under some conditions, a geotextile separation layer may be required between the natural ground and the engineered base. See **Geosynthetic Separation Layer, Sub-Drainage Component**, and **Engineered Base Preparation** for information relative to installation.

Characteristics of a Good Porous Pavement System

Elements Important to Structural Integrity

The Geoblock unit (or any other similar material) must have five primary characteristics to adequately support load. Those characteristics are (1) suitable wall strength, (2) sufficient unit stiffness, (3) significant joint strength, (4) a supporting base and (5) a large overall area.

1) 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) 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) 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) The **unit support base** must have 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) 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 provides a listing of strength characteristics of the Geoblock porous pavement system. These values provide a balanced system meeting all criteria important to the integrity and performance of a porous pavement system.

Table 3 Strength Characteristics of the Geoblock5150 Unit

Test	Value
Wall Compressive Strength (simulated tire area loaded) Test Procedure - Circular plate, 165 mm (6.5 in) diameter, loaded to failure	2,900 kPa (420 psi)
Wall Compressive Strength (full Geoblock unit loaded) Test Procedure - Full single unit loaded to failure via flat plate	615 kN (138,240 lbf)
Equivalent Elastic Stiffness Test Procedure - Simply supported Geoblock unit loaded to 25 mm (1 in) deflection	140 N-m² (48,000 lb-in²)
Joint Shear Strength Test Procedure - Direct shear of tongue-and-groove using special apparatus (See **NOTE**)	89.0 kN (20,000 lbf)
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 uncompacted soil and receive adequate water and nutrients to remain healthy.

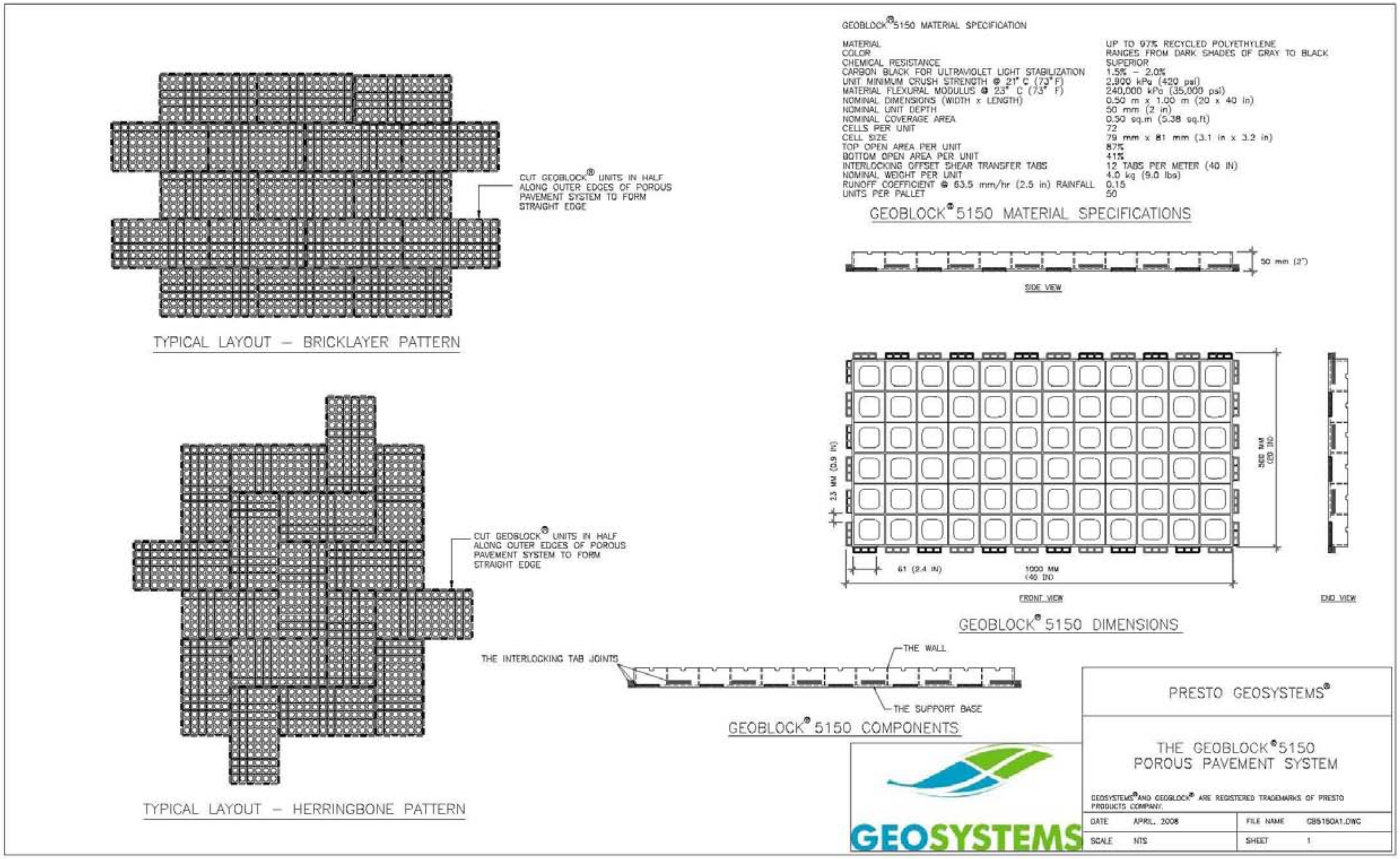

Figure 4 Geoblock®5150 System Material Specification and Layout

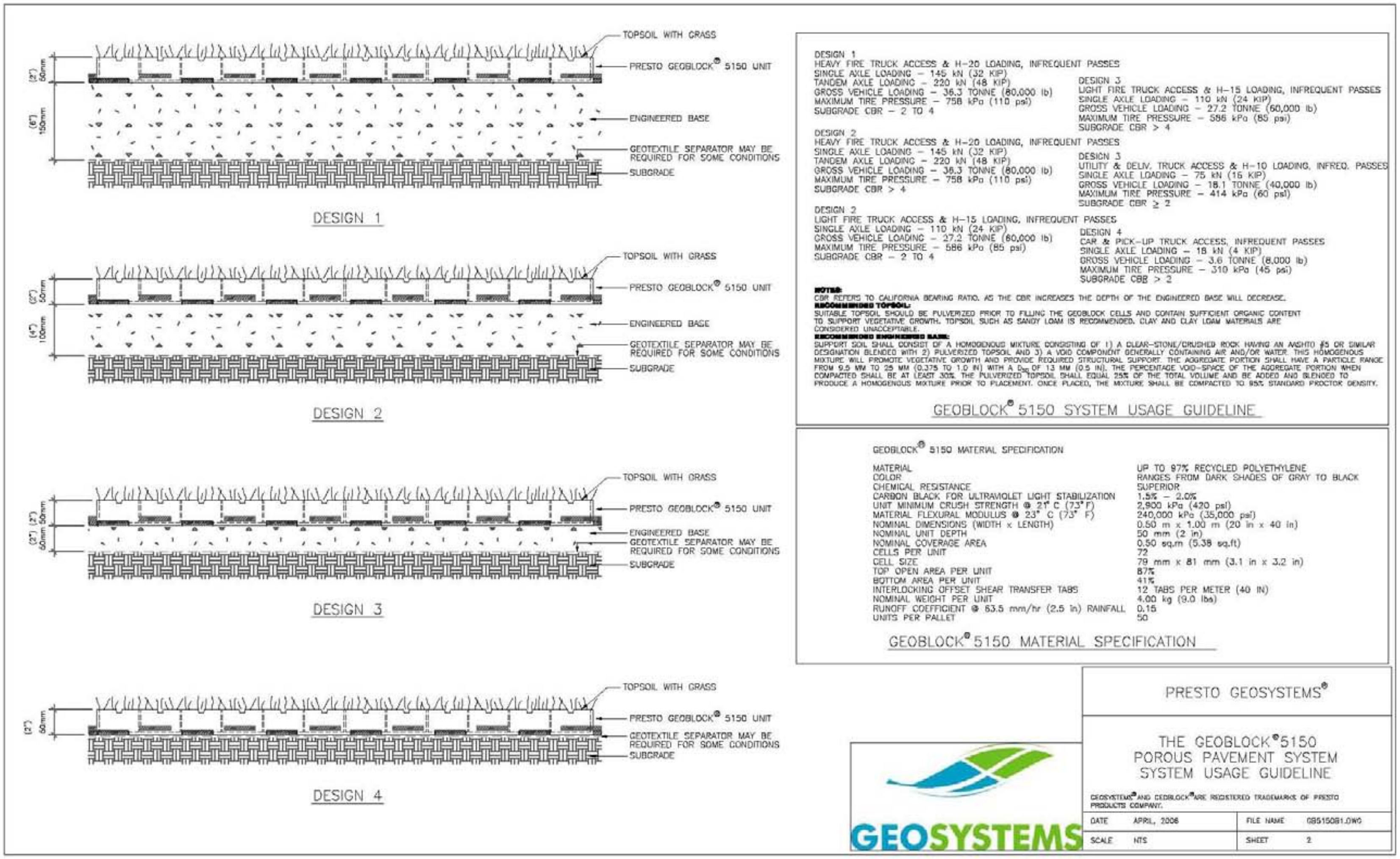

Figure 5 Geoblock®5150 System Usage Guideline

Installing the Geoblock System

Subgrade Preparation

Excavate the area, allowing for the Geoblock unit thickness and the *engineered base* depth (where the *engineered base* is required). When working with in-situ soils that have poor permeability, provide adequate drainage from the excavated area if the area has the potential to collect water. The in-situ soil should be relatively dry and free from any standing water. Finish-grade the surface of the in-situ soil specifically when the Geoblock unit is to be installed without an *engineered base*. Level and clear the area of large objects such as rocks, pieces of wood, etc. to enable the Geoblock units to interlock properly and remain stationary after installation.

Geosynthetic Separation Layer

If required and/or specified by the project engineer, the geosynthetic layer shall be rolled out over the prepared subgrade along the alignment of the reinforced surface. The geosynthetic shall be pulled taut to ensure that there are no folds. Geosynthetic layer overlaps, if required, shall be according to plans.

Sub-Drainage Component

If required and/or specified by the project engineer, install the specified sub-drain and outlet 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.

Engineered Base Preparation

The strength of the Porous Pavement System is determined, in part, by the support required by a stable *engineered base*. The health of the vegetation, however, requires that the *engineered base* be loose to facilitate root penetration. These two requirements seem to be in direct conflict – but they are not. Using an *engineered base* recommended in **The Engineered Base**, one can construct a base meeting both requirements.

Start with an aggregate relatively free from fines and with a void space of 30% or greater. A convenient field method to determine the void space and volume of topsoil to be blended with the aggregate is:

1. Overfill a 5-gallon plastic bucket (or other calibrated container) with the selected aggregate. The exact capacity of the container must be known to obtain correct results.
2. Completely compact the aggregate in the bucket and level so the surface of the aggregate is at the top of the bucket.
3. Fill the bucket with water and let stand for several minutes, then add additional water so the water is at the same level as the top of the bucket.
4. Drain the water off into another container making sure that all the water is captured.
5. Measure the volume of the captured water and compare it to the volume of the bucket to determine the percentage of voids in the aggregate. This is the amount of loose topsoil that is to be blended with the aggregate. **Caution** – do not exceed this amount of topsoil.

The *engineered base* material is spread over the prepared base and compacted to 95% Standard Proctor Density. Refer to **Table 2 Design Guideline: Base Recommendations** for *engineered base* depth recommendations.

NOTE: Typical compaction densities and testing do not apply to the *engineered base* since only the aggregate portion of the *engineered base* is compacted. The topsoil portion will remain relatively uncompacted when the mixture is correct. Therefore, conventional compaction testing and resulting densities will produce values that are not meaningful.

Geoblock Unit Installation

Orientation & Laying Pattern of Units

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

When the application is an **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 4.

When the application is a **large area with random traffic flow**, stagger the units to produce the herringbone pattern. This pattern reduces straight seams to one and a half block lengths. See Figure 4.

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.

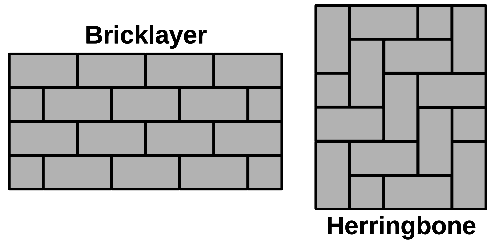

Figure 4 Laying Patterns

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. The separation distance can be calculated using the reference value given in the section titled **Thermal Expansion**.

Slide the units together so that the interlocking tab joint is fully engaged as illustrated in Figure 5. Units should be placed such that corners and seams do not protrude above the desired surface elevation.

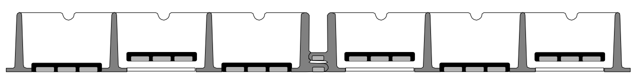

Figure 5 The Interlocking Tab Joint

Anchoring Units

The Geoblock units can be fixed in-place to prevent the units from shifting during installation with optional wood or metal stakes through the perimeter units, and/or, by placing thread-forming tapping screws (i.e. 1-1.5 in deck screws) through the perimeter interlocking tabs. This may be needed if 1) trafficking / turning of heavier construction vehicles cause movement of the units during the installation process or 2) large temperature changes occur during the installation process. Figure 6 illustrates some of the anchoring possibilities. In both cases, fixing the units in-place should occur after installation of all the units within the defined area.

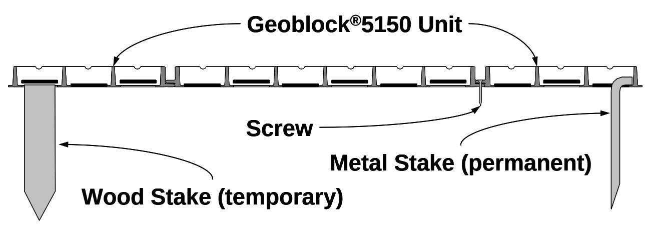

Figure 6 Anchoring Possibilities

Thermal Expansion

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.

Note that joint separation occurring from large temperature fluctuations is normal. Rejoining of the Geoblock units should be considered normal construction practice. Once infilled, thermal expansion is minimized. Once the root system is fully developed, the vegetation provides all necessary anchoring of the system.

Infilling the Geoblock Unit

Infill the Geoblock units with a suitable topsoil. Use spreading methods that will leave the cell infill uncompacted. <u>Overfilling the cells is not recommended since vehicular loading will cause undesirable compaction of the topsoil</u>.

Infilling should take place immediately after the units are installed to minimize the potential of joint separation caused by thermal expansion/contraction. Upward buckling of the Geoblock area is generally not an issue if the units have been installed using the recommended laying patterns and infilled.

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

For application of the vegetation, see **Seeding** and **Sod Application** in the **Finishing Procedures** section.

Finishing Procedures

Seeding

Follow seeding, fertilizing, and watering procedures for turf establishment based on regional practices. An increase in watering frequency may be necessary when free-draining base materials are used. Use of a free draining base is generally not recommended.

Sod Application

Sod can be used for areas where immediate use 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:

- Sweep out the topsoil from the Geoblock unit to allow room to seat the sod. 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 normal practices.
- Press the sod into the partially emptied cells using a roller or other suitable equipment.
- Use recommended watering procedures to ensure healthy sod growth.

Delineation

Once healthy turf has been established, the Geoblock cell wall structure will have minimal visibility when good turf-maintenance practices are followed.

If used for an emergency access lane, delineation may be desirable to create greater visibility. Delineation methods can include the following: in-ground or above-ground curbing, shrubbery or vegetation, perimeter lighting or delineation markers, or other suitable systems.

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 effect overall structural integrity of the system.

Snow Removal

If required, snow removal should be done using one of the following basic procedures:

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

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 system that protrudes above the normal surface level could be removed by the blade. **NOTE**: Damage can occur to the grass and topsoil if plowing abuse is prevalent.

Estimating Time and Cost of Installation

Typical Crew Size and Responsibilities

2	People to set the Geoblock units in place.
2	People to spread and level the topsoil infill.
1	Equipment operator for the front-end loader.

NOTE: Adding or subtracting one or two people to the crew may result in a cost-effective productivity increase depending on local work habits.

Equipment Needed and Purpose

- Saws, screw drivers, hammers, stakes, screws – all of some of these for cutting and securing the Geoblock units as required per the plans or as needed during construction.
- A small front-end loader for infilling of the Geoblock units.
- Rakes and shovels for final leveling of the infill material.

Typical Construction Sequences and Times

Productivity is a variable and the ranges below are typical. Select an installation rate through personal experience or after discussion of project details with Presto or one of its qualified distributors.

1.	Place the Geoblock units on the prepared base.	75 - 100 units/man-hr
2.	Fill the in-place Geoblock units using the small loader to evenly distribute the topsoil infill.	100 - 120 units/man-hr
3.	Level the infill using rakes and shovels so that the topsoil is flush with the top of the cell wall.	75 - 100 units/man-hr
4.	Spread selected grass seed and water.	150 - 180 units/man-hr

NOTE: The above four sequences can be in progress at the same time if workspace is adequate.

Table 4 Approximate Quantities of Infill Material Required for Geoblock Unit

Depth of unit	Volume of Topsoil Required per unit	Volume of Topsoil Required per 100 m² (1000 ft²)
50 mm (2 in)	0.025 m³ (0.0327 yd³)	5.00 m³ (6.08 yd³)
NOTE: The above quantities are based only on the 50 mm (2 in) cell depth Geoblock unit.		

General Notes

1. The front-end loader must be sized so it can distribute the fill material per time/productivity requirements.
2. Experience shows that the above installation rates would be considered <u>typical rates of installation</u>.
3. As is with all construction operations, placement of material stockpiles, crew productivity, jobsite conditions, special installation requirements such as cutting and custom fitting of the Geoblock units, etc. significantly affect overall productivity, therefore actual results may be different than the estimates above.

Total Time and Materials Required

Area of Installation = length x width of site

(________) m (ft) long x (________) m (ft) wide = (________) m² (ft²) Area

Geoblock Units Required = m² (ft²) Area ÷ 0.50 m² (5.38 ft²)/unit
[the Geoblock unit is 0.50 m x 1.00 m (20 in x 40 in) nominal]

(________) m² (ft²) Area ÷ 0.50 m² (5.38 ft²)/unit = (________) units

Man-Hr Required for Installation of Geoblock Units = Geoblock units ÷ 100 units/man-hr

(________) units ÷ 100 units/man-hr = (________) man-hr

Infill Material Quantities = Geoblock units x m³ (yd³)/unit (see Table 4)

(________) units	x	(________) m³ (yd³)/unit	=	(________) m³ (yd³)

Man-Hr Required for Placing Infill = Geoblock units ÷ 120 units/man-hr

(________) units	÷	120 units/man-hr	=	(________) man-hr

Man-Hr Required for Leveling of Infill = Geoblock units ÷ 100 units/man-hr

(________) units	÷	100 units/man-hr	=	(________) man-hr

Man-Hr Required for Seeding = Geoblock units ÷ 180 units/man-hr

(________) units	÷	180 units/man-hr	=	(________) man-hr

Total Cost of Time and Materials

Geoblock unit cost	$________/unit	x	________units	=	**$** ______________
Cost of Infill	$________/m³ (yd³)	x	________m³ (yd³)	=	**$** ______________
Cost of Labor	$________/man-hr	x	________man-hr	=	**$** ______________
Cost of Equip. Operator	$________/man-hr	x	________man-hr	=	**$** ______________
Cost of Front-end Loader	$________/hr	x	________hr	=	**$** ______________
			APPROXIMATE TOTAL COST		**$** ______________

NOTE: The above estimate does not include time and materials associated with initial base preparation. The cost of this item would be similar to other pavement systems regardless of type.

Limited Warranty

Presto Geosystems warrants each Geoblock®5150 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®5150 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®5150 system. Contact Presto Products Company, Ph: 800-548-3424; 920-738-1707 or Email: info@prestogeo.com.

Disclaimer

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Project specifications take precedence over all manufacturers' recommendations.

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