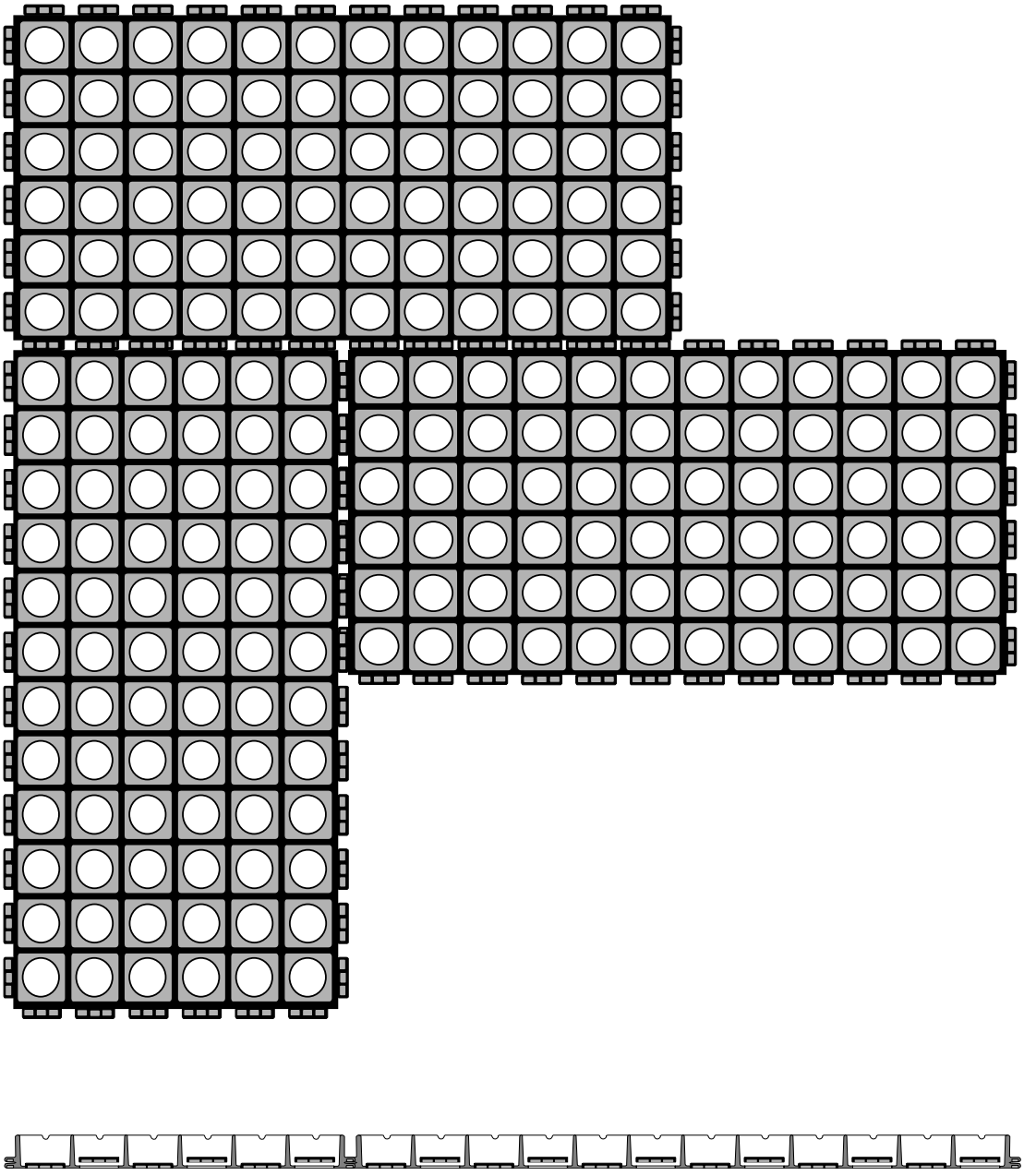
GEOBLOCK® POROUS PAVEMENT SYSTEM
TECHNICAL OVERVIEW



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Introduction

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 system has four major components once fully developed (see Figure 1). The components are (1) the Geoblock unit, (2) the base support soil, (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. Other components may include additional geosynthetic reinforcement and topsoil additives to enhance vegetative growth. A review of the four major components follows.

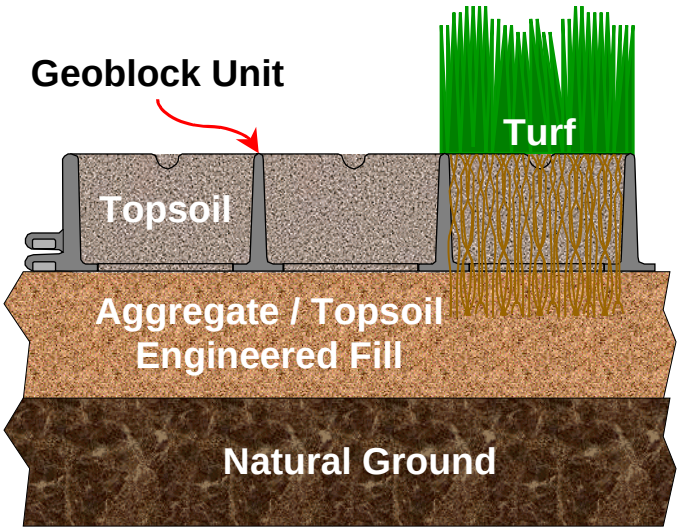

Figure 1 The Geoblock Porous Pavement System Components

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.

Importance of Structural Integrity

The Geoblock unit (or any other similar material) must have five primary characteristics to adequately support loads (see Figure 2). 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.

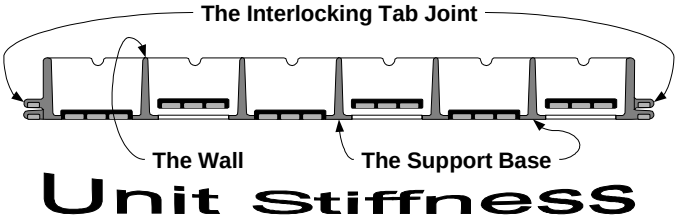

Figure 2 Components of the Geoblock Unit

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.

What's not important structurally

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 1 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. See ***Geoblock® Porous Pavement System - Material Specification*** for details of the Geoblock unit.

Table 1 The Geoblock Porous Pavement System - Strength Characteristics

Wall Compressive Strength (simulated tire area loaded) Test Procedure - Circular plate, 165 mm (6.5 in) diameter, loaded to failure	
GB-.5150 Geoblock Unit	2200 kPa (320 psi)
Wall Compressive Strength (full Geoblock unit loaded) Test Procedure - Full single unit loaded to failure via flat plate	
GB-.5150 Geoblock Unit	615 kN (138,240 lbf)
Equivalent Elastic Stiffness Test Procedure - Simply supported Geoblock unit loaded to 25 mm (1 in) deflection	
GB-.5150 Geoblock Unit	140 N-m² (48,000 lb-in²)
Joint Shear Strength Test Procedure - Direct shear of tongue-and-groove using special apparatus (See NOTE)	
GB-.5150 Geoblock Unit	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 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. In addition, 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.

The Engineered Base

For a given applied load over an existing subbase soil, both the base soil as well as the Geoblock unit provide support. The soil characteristics and depth of the engineered base should be determined using both loading and subbase strength. The engineered base should be a mixture of compacted granular and topsoil. An open granular or gap-graded granular with approximately 30% void space after compaction is best for the granular component. The mixture should be compacted to a density that will provide a minimum California Bearing Ratio of 7. Refer to design recommendations for the suggested minimum depth of the engineered base.

In addition to providing load support, the engineered base influences the vegetative cover. Topsoil is mixed with the granular to occupy the 30% void space. Compaction of the granular should not influence the topsoil. The uncompacted topsoil component allows for water percolation and root penetration.

The Topsoil Infill

The topsoil infill should provide a nourishing medium for development of a healthy root system for the vegetative cover. The topsoil should not be compacted in the Geoblock unit. Final topsoil placement should be at or slightly below the level of the Geoblock cell wall.

The Vegetation

The vegetative cover type should be selected by a qualified agronomist and be resilient enough to withstand the anticipated load frequency. Heat and automotive fluids from excessive traffic can over-stress any vegetative cover.

Disclaimer

This document has been prepared for the benefit of customers interested in the Geoblock Porous Pavement System. It was reviewed carefully prior to publication. Presto Products Company assumes no liability and makes no guarantee or warranty as to its accuracy or completeness. Final determination of the suitability of any information or material for the use contemplated, or for its manner of use, is the sole responsibility of the user.