

Porosity, Permeability and Infiltration

Permeability – the rate at which a fluid flows through a porous substance under given conditions.

Porosity (void space) – the portion of a volume of material that is not solid

Infiltration – movement of a fluid into the surface of a porous substance.

Infiltration and Permeability are used interchangeably in reference materials

The **Permeability** (infiltration) of **Grasspave2**

Sand permeability = 8.27 inches/hour

Grass in Sand root zone = 9 to 25 inches per hour (various USGA mixes)

Base course poor draining = 2.63 inches/hour* (sandstone with 10% fines)

Base course common = 7.37 inches /hour* (limestone with 3% fines)

Base course mixed = 38.55 inches /hour***** (66% GP and 33% GW)

Subsoils need to infiltrate at least 0.5 in/hr to be considered permeable** and recommended soils would be loam, sandy loam, or loamy sand.

Our system would deliver **2.63 to 38.55** inches of water per hour to the subsoils.

The **Permeability** (infiltration) of **Gravelpave2**

Open graded aggregate, 1/4" = 2500 inches/hour***

0.1" to .2" inside open-celled grids = 40+ inches per hour*****

Base course poor draining = 2.63 inches/hour* (sandstone with 10% fines)

Base course common = 7.37 inches /hour* (limestone with 3% fines)

Base course mixed = 38.55 inches /hour***** (66% GP and 33% GW)

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Our system would **2.63 to 38.55** inches of water per hour to the subsoils

The **Porosity** (void space) and Water Storage of **Grasspave2**

13 inch cross-section

One inch Grasspave2 with Sand = 20% void

12 inches base course = 20% void (16%-and-up depending on composition)

13 inches x approx. 20% void space =

2.6 cubic inches of Water Storage

The **Porosity** (void space) and Water Storage of **Gravelpave2**

13 inch cross-section

One inch of Gravelpave2 with Open Graded Aggregate at 3/16" – 3/8" = 35%

12 inches base course = 20% void (16-35% depending on composition)

(One inch x 35%) + (12 inches at 20%) =

2.75 cubic inches of Water Storage

GW = Well graded, clean gravels, gravell/sand mixtures
GP = Poorly graded, clean gravels, gravell/sand mixtures

All rates are approximate and actual installed rates will vary depending on local materials and other conditions.

If existing site soils infiltration rates are below .5 in/hr (silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, or clay), additional drainage is recommended below Grasspave2 and Gravelpave2.

**Permeability of Pavement Base Course, SAM I. THORNTON & CHIN LEONG TOH, Civil Engineering Department, University of Arkansas, May 1995*

***Guidelines set by the EPA*

****AASHTO, 1993, p I-19, extracted from page 144, Porous Pavement, Bruce Ferguson, Taylor and Francis, 2005.*

***** Pratt et al 1995 extracted from page 144, Porous Pavement, Bruce Ferguson, Taylor and Francis, 2005.*

****** Data from "Civil Engineering Design Manual", 1995*