

# 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\*\*

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)

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 **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, gravel/sand mixtures

GP = Poorly graded, clean gravels, gravel/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

