

WHAT SAND TO USE?

A SIMPLE PERMEABILITY TEST

Most architectural plans specify “Free-Draining Aggregate” which is often taken to mean aggregate of at least 7mm, although often 15-20mm is used. However, for most purposes, using coarse sand is more than adequate and is easier to handle. One of the distinguishing features of Capiphon Drainage is that we specify back-filling with coarse sand, rather than gravel.

But what is “coarse sand”? There are different types of sand and they vary in their drainage performance. **Table 1** has some of the Universal Soil Classification System (USCS) classifications with their permeability. The higher the permeability, the better the drainage.

These USCS descriptions are not commonly used. In Australia and NZ there are a variety of terms used to describe sands and these change from place to place and from time to time, to the extent that not even the suppliers know which sand to recommend.

We have devised a simple test for you to use to avoid confusion, and for you to compare the sands available. You will need:

- 200mm of 50mm DWV PVC.
- 300mm of 40mm DWV PVC with an end cap (bottom) marked with indelible pen at 100mm from the bottom.
- 100mm by 100mm of Capiphon belt.
- Plastic jug.
- Stopwatch (on your phone)
- A dish to collect the drained water (optional).



Place the sand in the 50mm pipe, gently tamping with the 40mm pipe to the 100mm mark on the tamp. This leaves 100mm above the surface of the sand. Place the pipe on the piece of Capiphon to allow the water to drain freely. Fill the 50mm pipe to the top and note the time taken for the water to drain down to the top of the sand column.

Table 1 below shows some indicative times for common sands to drain. Note that a “poorly graded” sand contrary to the way it sounds, is better for drainage than a “well graded” sand. This is because well graded means that the particles range from larger through to smaller size and can, therefore, pack together. Smaller particles block the passage of water flowing between the larger ones.

Note also how the presence of clay and silt impedes drainage. Sands to avoid are those often described as “bedding Sand”, “Fat Sand”, “Brickies’ Sand” or “Brickie’s Loam”.

Table 1: Permeability of USCS classification aggregates
(modified from <http://www.geotechdata.info/parameter/permeability.html>)

Description	Permeability (mm/min)	Time for 100mm (minutes)
Well graded gravel, sandy gravel, with little or no fines	30.00	3.33
Poorly graded gravel, sandy gravel, with little or no fines	30.00	3.33
Silty gravels, silty sandy gravels	0.00	33,333.33
Alluvial sand and gravel	24.00	4.17
Clayey gravels, clayey sandy gravels	0.00	333,333.33
Very fine sand, very well sorted	5.04	19.84
Medium sand, very well sorted	133.80	0.75
Coarse sand, very well sorted	22140.00	0.00
Poorly graded sands, gravelly sands, with little or no fines	1.53	65.36
Clean sands (good aquifers)	0.60	166.67
Uniform sand and gravel	240.00	0.42
Well graded sand and gravel without fines	2.40	41.67
Silty sands	0.00	166,666.67
Clayey sands	0.00	303,030.30
Inorganic silts, silty or clayey fine sands, with slight plasticity	0.00	333,333.33
Inorganic clays, silty clays , sandy clays of low plasticity	0.00	3,333,333.33

Recommended

Table 2: 100mm Drainage Times for Common Australian Sands

Supplier	Description	Time for 100mm (minutes)
Frank Z, Building & Garden Supplies, Thomastown Victoria	Washed Sand	2:35
	Concrete Sand	6:25
Daisy's Garden Supplies 14-16 Mt. Dandenong Road, Ringwood East	Coarse Washed Sand (propagating)	0:50
	Washed Sand	1:25
	White Washed Sand	3:00
Males Sand Supplies 377 Macquarie Street South Hobart	Coarse Sand	1:45
	Plastering Sand	1:35
	Concrete Sand	4:05
	Fat Sand (White)	15:05
	Potting Sand	0:30
Rock & Redgum Garden Supplies Cnr Dalkeith Drive & Brasser Ave Dromana, Victoria	Coarse Washed Sand (propagating)	0:50
	Washed Sand	1:25
	White Washed Sand	3:00
Rosebud Garden Supplies 12 Colchester Rd, Rosebud West VIC	Washed White Sand	2:13
	Concrete Sand	4:30

Marginal

Avoid