

SYSTEM SAND



Although Advanced Enviro))Septic pipes are at the core of the purifying performance of System O)) installations, system sand (filter sand) also plays an important role in its success. To help you understand this role and the required criteria for a System O)) installation, DBO International is sharing a description of the different parameters to respect.

System sand controls the speed at which the water flows out of the Advanced Enviro))Septic pipes. This slower flow rate caused by the sand makes its very good at extracting minute particles from the water by filtration, but also allows sufficient retention time for microorganisms in the pipes to assimilate pollutants.

System Sand Characteristics

The system sand used to complete a septic installation has very specific parameters.

FINE PARTICLES

It has been demonstrated that the presence of too many fine particles in the system sand can prematurely clog the interface between the latter and the native soil. These particles migrate to this interface with the water and obstructs the soil's pores and the air voids between coarse grains of sand. A high concentration of fine particles in the sand can be detrimental to the optimal operation of the system, whether it's an above-ground sand filter, a classic sand filter or a System O)) installation.

To be noted, fine particles in a crushed stone layer also affects the operation of a septic system. Same as for the system sand, these particles migrate with the flow of water and can clog the native soil's pores. The higher the concentration of fine particles, the higher the risk. In fact, this is why we must always used washed crushed stone, be it for the stone layer of a purifying element or the leach field. It's simple, really: fine particles must be avoided during the installation of a septic system.

UNIFORMITY COEFFICIENT

The Uniformity Coefficient (C_u) represents the relationship between the diameter of the coarse grains of sand over the fines. The more the sand is homogeneous, the smaller the Uniformity Coefficient. Worst case, if the system sand is composed of identical grains of sand, its Uniformity Coefficient would be 1 as these grains all have the same diameter. This maximises the air voids between them.

On the other hand, a large spread in the sieve analysis of the sand should be avoided. In this type of sand, the fine particles fill some of the air voids between the coarse particles, resulting in a denser sand. Using sand with a high C_u in a septic installation can lead to premature clogging. In order to limit the spread of the sieve analysis, the Uniformity Coefficient must be lower than 6.

FINE VS COARSE PARTICLES

Sand that is too fine means that the air voids between the grains are too small, which limits the water flow. Coarse-grain sand, on the other hand, has a retention time that is too short to treat effectively. A balance is required for optimal wastewater treatment.



REQUIREMENTS

To ensure that all these parameters are adequate for a System O)) installation, the following requirements must absolutely be met:

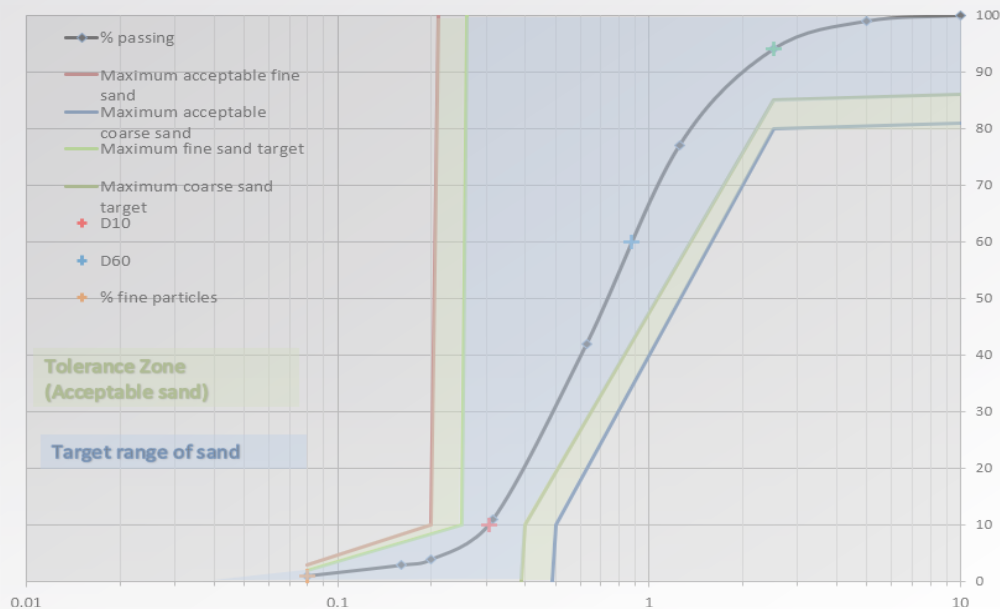
- The nominal diameter or D10, corresponds to the diameter of the particles when 10% of the sand has passed through the standard sieves used for a particle size analysis. It must be between 0.2 and 1.0 mm.
- The Uniformity Coefficient or Cu, indicates the spread of particle sizes. It is calculated by dividing the D60 (the diameter of the particles when 60% of the particles have passed through the sieve) by the D10. It must be smaller than or equal to 6.
- The percentage of fine particles whose diameter is smaller than 80 µm (0.08 mm) must be smaller than or equal to 3%.
- The percentage of coarse particles whose diameter is over 2.5 mm must be smaller than or equal to 20%.

THE IMPORTANCE OF A SIEVE ANALYSIS

To minimise the variation of a sand's sieve analysis, suppliers are recommended to prepare piles of processed sand to increase its homogeneity. Once a pile has been established, the supplier should have a representative sample analysed to obtain a sieve analysis. The results from the lab will help determine if the sand complies with the above criteria.

SYSTEM SAND EVALUATION TOOL

DBO International's Technical Team has developed a worksheet to quickly check if a sand is acceptable or not. From a system sand's sieve analysis, the tool helps determine if the sand is within the necessary range. This tool also graphically presents the sand's granulometric curve. The following figure is taken from this worksheet. The "% passing" curve shows an example of a sand that respects the desired criteria. Don't hesitate to communicate with our Technical Team if you have any questions regarding its use.



A LONG-LASTING INSTALLATION

In conclusion, the system sand is a key element in the operation of a System O)) septic installation, particularly because of the balance it provides between water flow rate and retention. In the interest of benefiting from a System O)) septic installation with optimal life span and treatment capacity, it will always be vital to ensure that the system sand corresponds to the required criteria across the board.