DBO Clic

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HOW WATER IS DISTRIBUTED IN SEPTIC SYSTEMS

Distributing water is an essential element to the proper functioning and durability of a septic system with a specific footprint. Whether for a conventional system such as an infiltration trench, leach field unit, leach field or polishing field, there are many different ways to distribute the water.

We'll discuss the importance, advantages and disadvantages of these different modes of distribution to assist in the decision-making process.

THE IMPORTANCE OF EVEN DISTRIBUTION

Any system designed for a specific surface has a common element: the need to distribute the effluent evenly on the entire surface. A system relies on different materials – filtering element, reagent or native soil – to adequately treat or complete the treatment of the wastewater. So an even distribution is essential to using the entire treatment element.

Moreover, proper distribution increases the longevity of this type of system. The distribution of wastewater or partially treated water towards a inadequately-sized surface would clog the receiving surface by an organic overload, which, for some systems, leads inevitably to the end of their useful life. By distributing evenly across the entire surface area, the clogging process is slowed by the absence of this overload, even completely eliminated by the regeneration capabilities of some systems, such as System O)).

In order to distribute evenly across the entire surface, two criteria must be considered:

DISTRIBUTION BETWEEN ROWS

Most distribution systems are composed of pipes or infiltration chambers spread on a surface, across many rows. Obviously, an efficient distribution between all rows is the first step towards even distribution of the water. The different modes of distribution aim mainly for this aspect.

LENGTH-WISE DISTRIBUTION

Less considered, the distribution of the water along each row is just as important. For instance, the majority of conventional installations do not use this method by simply using perforated pipes. Although a low-pressure distribution would alleviate this weakness, this method is far less popular than gravity-fed systems.

This weakness is in part responsible for the limited useful life of conventional leach fields: with only a simple supply at the start of the system, only the first few centimeters really receive water. This hydraulic and organic overload, as stated above, significantly increases the sludge buildup in the native soil. Only once these are fully clogged can the following centimeters receive water. Without the ability to unclog, it is only a question of time before the entire system is clogged.

The Advanced Enviro))Septic pipes used in System O)) have proven, on the bench test as well as in the field since 2004, their ability to distribute length-wise after a few weeks of use, even with a gravity-feed. Its ideal bacterial support and great ability to autoregulate, water is quickly assimilated over several meters, with losing control over the biomass (see DBO))Clic – Sludge).

DIFFERENTS MODES OF DISTRIBUTION

Here are the different modes of distribution as well as their advantages and inconveniences.

Gravity

Gravity-fed systems are supplied through a distribution box coupled to valves, for example, equalisers, that regularise water flow to each exit.

Gravity-fed supply has many advantages for its passiveness and simplicity. What little maintenance required is very simple. In some cases, the system can be left on its own devices for many years without any maintenance whatsoever. There are no moving parts or electricity required are the greatest advantages of this method. Site conditions must, however, allow it.

Associated constraints to this distribution method are mainly at the level of efficiency. Starting at a specific daily flow, the lack of precision that this method brings takes on some importance. Some regulations can limit the use for the bigger systems. A major inconvenience of the method is its low length-wise distribution. For the majority of systems, a gravity-fed supply would rarely lead to an effective longitudinal distribution, like System O)) can do naturally in similar conditions, for example. Finally, for a system requiring no monitoring, a gravity-fed system can be unbalanced between the rows that will never be detected. This can then also affect the durability of the system.

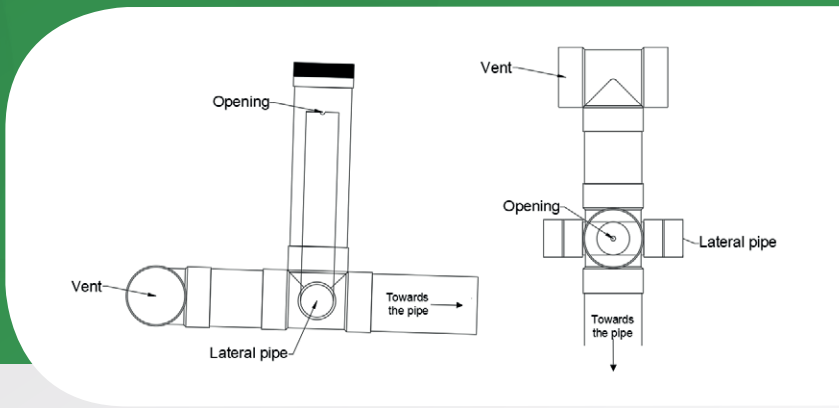
LOW-PRESSURE DISTRIBUTION

When conditions do not allow for a gravity-fed supply, a system with injectors at the start of each row is an option. This method consists in supplying one low-pressure injector per row. An opening on top of the pipe squirts water towards a cover, which then drains towards the system by gravity.

The main advantage with this method is the good distribution between rows thanks to the pressure, whatever the daily flow. It is a solution to one of the weaknesses with a gravity-fed system. Monitoring and maintenance while more involved than for a gravity supply, is still relatively simple. By opening the injector covers and starting the pumping cycle, the height of the water jets can be checked to monitor if there is an obstruction of one of the pipe openings. Simply brushing the injectors can restore uniform distribution.

Finally, the water jets also provide oxygenation.

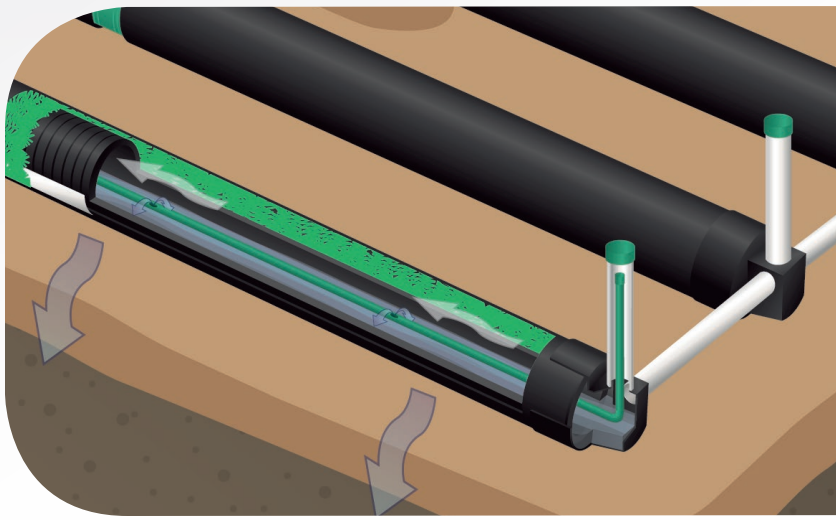
In the minus column, this method has the same problems as a gravity-fed system in terms of length-wise distribution. From a maintenance stand-point, a lifting station is required, which means more use and maintenance costs and could involve parts breakage.



LOW-PRESSURE LONGITUDINAL DISTRIBUTION SYSTEM

Also coupled with a lift station, a third possible distribution method is the low-pressure distribution system (LPDS). In comparison to the preceding method, the wastewater is distributed as much between the rows as along them. To do this, different lateral pipes with openings are added to a primary distribution pipe.

This distribution method is very efficient for a uniform distribution on a large surface. Contrary to other methods discussed here, it can distribute between and along the rows. Although a gravity-fed System O)) already ensures length-wise distribution naturally, a LPDS can do it quickly, the moment the system starts. In addition, the thickness of the required system sand layer under the pipes can be decreased, resulting in an appreciative reduction in material costs.



A disadvantage of the LPDS is with its maintenance. It is more difficult to determine if an opening is blocked. A piezometer at the end of each row, such as with System O)), can however show if there is a imbalance. If this is the case, maintenance is more complex as there is no direct access to the pipe openings. A high-pressure washing or using a brush or other pipe cleaner can restore a uniform distribution.

THE DOSING SYPHON

The dosing syphon is a half-measure between gravity-fed supply and a low-pressure distribution device.

Although this system requires conditions allowing for a gravity-fed supply, it can send water with some velocity, resulting in a low-pressure distribution without needing a lifting station. The distribution between the rows is thus more dependable than that of a gravity-fed system for larger flows. It is a good alternative if there is no electricity, if conditions allow.

Associated disadvantages with this method are once again with the length-wise distribution. Moreover, its installation can be complex. The system must be absolutely level for a uniform distribution of water. A slope between two rows can significantly alter the distribution. This type of distribution device is thus less popular.

CONCLUSION

Each distribution method has its share of advantages and disadvantages. According to site conditions, size of the system, its treatment capacity, the availability of electricity, maintenance service or even local laws and regulations, any method of distribution can be preferred.