

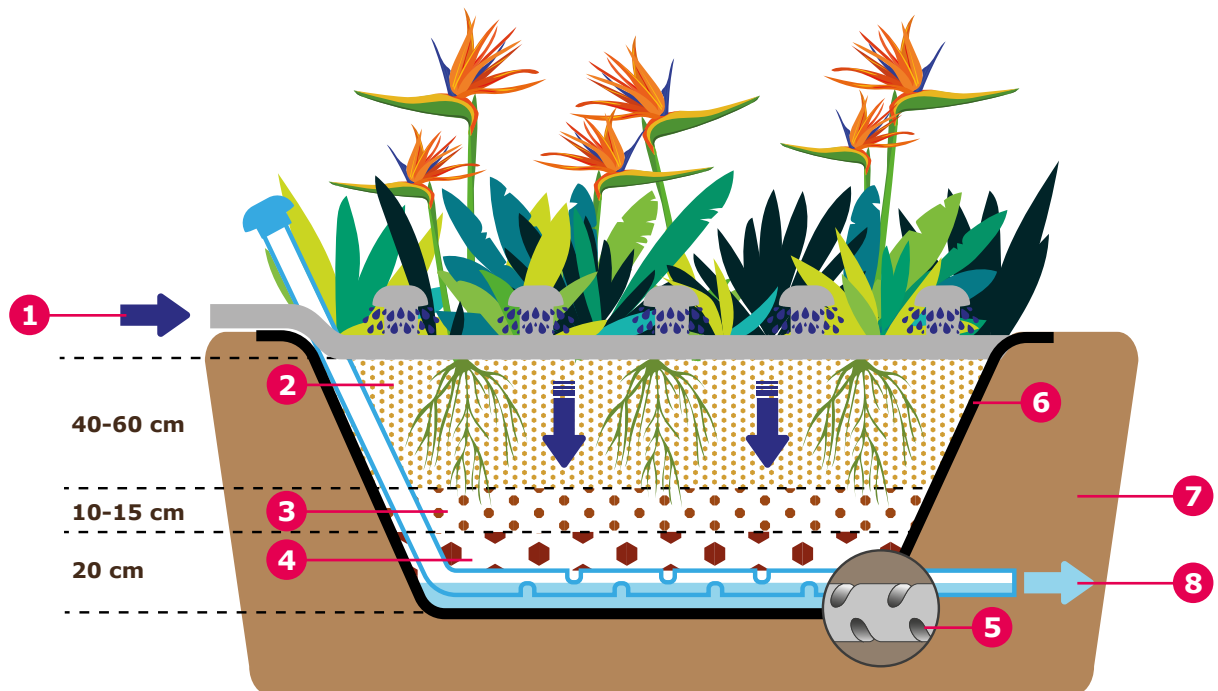
# VERTICAL FLOW TREATMENT WETLAND (USING SAND)

## DESCRIPTION

In vertical flow treatment wetlands, primary treated wastewater is intermittently loaded onto the surface of the filter, through which it percolates vertically. The system is unsaturated and operates under aerobic conditions thanks to passive aeration. Effective primary treatment is required to remove particulate matter or some dissolved pollutants to prevent physical and biological clogging of the filter. The filters are fed in batches to distribute the wastewater over the whole surface of the filter in operation.

Depending on the design, the system can be implemented using different filters, in parallel or otherwise. Emergent wetland vegetation is used. Vertical flow wetlands are employed when aerobic treatment of wastewater is required (like for nitrification).

Like the French system, these treatment wetlands are composed of three layers, but the main difference is that sand is used for the filtration layer.



- |  |                                  |
|--|----------------------------------|
| 1- Influent (primary treated wastewater) | 5- Drainage system               |
| 2- Filtering layer (sand)                | 6- Waterproof liner              |
| 3- Transition layer (medium gravel)      | 7- Original soil                 |
| 4- Drainage layer (coarse gravel)        | 8- Effluent (treated wastewater) |











## TYPE OF INFLUENT

Vertical flow wetlands (using sand) are used for secondary or tertiary treatment. They can be installed following a French vertical flow wetlands or septic tanks, depending on the treatment goal.

## TREATMENT EFFICIENCY

COD	BOD <sub>5</sub>	TSS	TN	NH <sub>4</sub> -N	TP
70 - 90 %	~ 80 %	80 - 90 %	20 - 40 %	80 - 90 %	10 - 35 %

## ADVANTAGES / DISADVANTAGES

ADVANTAGES		DISADVANTAGES
		Need for sand
		Need for primary treatment
Possible operation in separate and combined sewer systems		
High tolerance of occasional hydraulic load fluctuations		Sensitive to organic overloads
Lower risk of clogging than horizontal flow wetlands		
Can operate without or with a low energy input (if fed by gravity with siphons)		Feeding system needs either mechanical (siphons) or electromechanical (pumps) components
No specific hazard of mosquito breeding		
Lower land requirement than a horizontal flow treatment wetland		
Reuse potential (irrigation) with additional disinfection step		
		Plants harvesting once or twice a year