

# FRENCH VERTICAL FLOW TREATMENT WETLAND

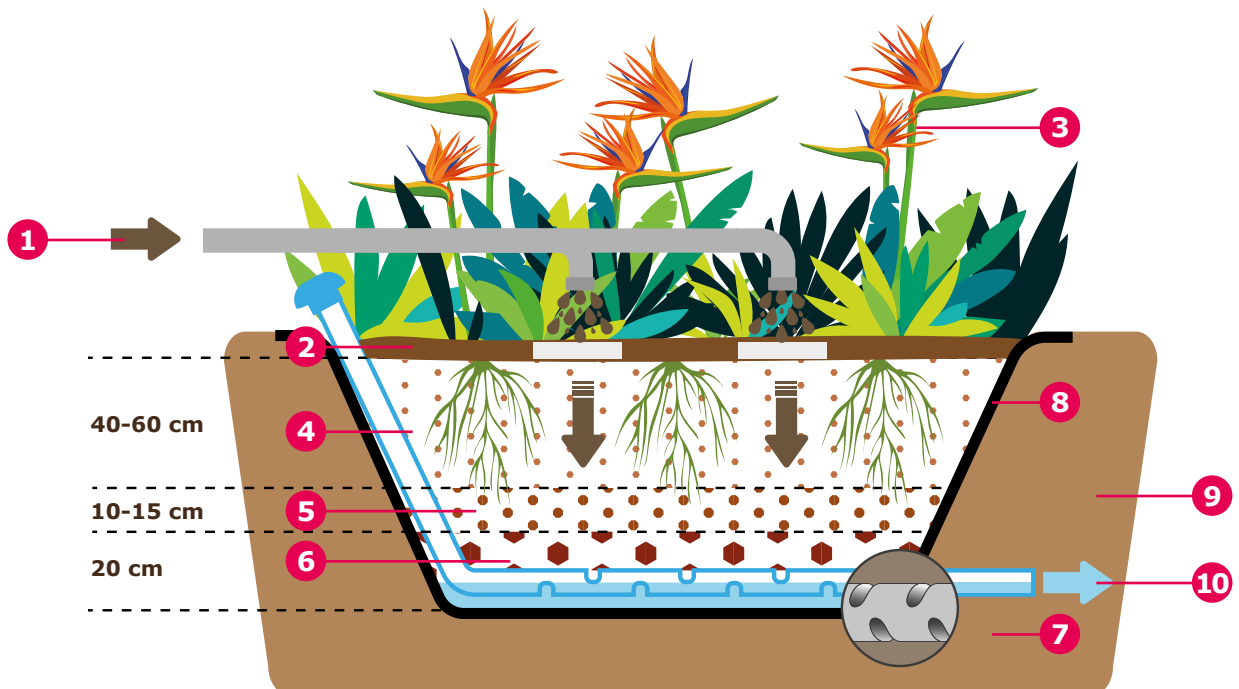
## DESCRIPTION

The French vertical flow treatment wetland is a specific configuration of the vertical flow treatment wetland for the treatment of raw wastewater. In tropical climates, it is fed by intermittent loading on two parallel filters, each fed in turn for 3.5 days. Sludge accumulates and mineralizes at the surface. The French vertical system operates for more than 15 years without removing the surface deposit (20 cm maximum). The stems of the plants penetrate the deposit layer, thus ensuring water infiltration through the organic surface deposit.

The treatment takes place under aerobic conditions. The wastewater passes through three layers:

- a porous medium (fine gravel), where the microbial biomass consumes the organic matter;
- a transition layer (coarse gravel);
- a drainage layer (gravel), where a drainage and aeration pipe carries the treated water to the discharge environment.

Different designs exist to improve performance (recirculation, implementation of a saturated layer at the bottom, etc.). The first stage of French vertical flow treatment wetlands can be employed in association with additional treatment wetland stages or ponds (lagooning).



- |   |                                   |
|---|-----------------------------------|
| 1- Influent (raw screened wastewater)                           | 6- Drainage layer                 |
| 2- Surface organic deposit (sludge)                             | 7- Drainage system                |
| 3- The stems penetrate the organic deposit and prevent clogging | 8- Waterproof liner               |
| 4- Filtering layer  | 9- Original soil                  |
| 5- Transition layer   | 10- Effluent (treated wastewater) |











## TYPE OF INFLUENT

Raw wastewater, only pre-treatment by coarse screening is needed.

## TREATMENT EFFICIENCY OF FIRST STAGE CLASSICAL FRENCH SYSTEM

COD	BOD <sub>5</sub>	TSS	TN	NH <sub>4</sub> -N	TP
> 75 %	~ 80 %	~ 80 %	10 - 20 %	> 50 %	10 - 20 %

## ADVANTAGES / DISADVANTAGES

ADVANTAGES		DISADVANTAGES
Simple sludge management		
Feeding with raw wastewater (reduced operation and maintenance costs)		
Possible to operate in separate and combined sewer systems		
High tolerance of occasional hydraulic and organic load fluctuations		
Lower risk of clogging than horizontal flow treatment wetlands		
Can work without energy input (if fed by gravity with siphons)		Feeding system may require electromechanical component (pumps) when feeding by gravity is not possible (low slope of the land)
No specific hazard of mosquito breeding		
Requires less land area than a horizontal flow treatment wetland		
Reuse potential (irrigation) with additional disinfection step		
		Need to identify local, non-invasive plant species. Plants harvesting once or twice a year