



CAPIPHON™ FLOW RATES

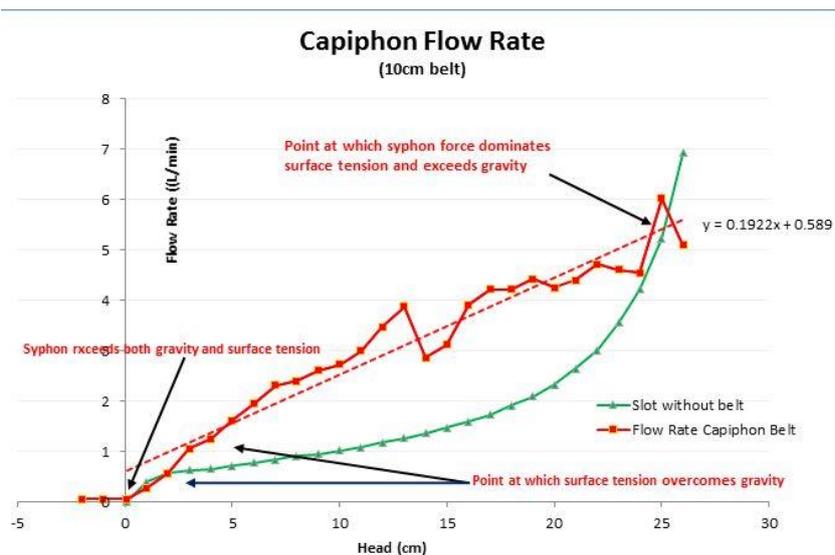
Note 1: Flow rates quoted for agricultural (slotted) pipe are the capacity of the pipe to move water that enters it. There is no direct performance standard for sub-surface drainage, however the minimum requirement for the Australian Standard AS2439.1 for clear water opening is 1,500mm²/m. Capiphon's clear water opening (20,000mm²/m for 10cm belt) clearly exceeds that.

Note 2: Head loss in corrugated polyethylene pipe (CPE) commonly known as ag pipe is generally 40-50% greater than in smooth pipe. Water remains within the corrugations leading to reduced flow as suspended silt settles. The trapped water also attracts plant roots which further impedes flow.

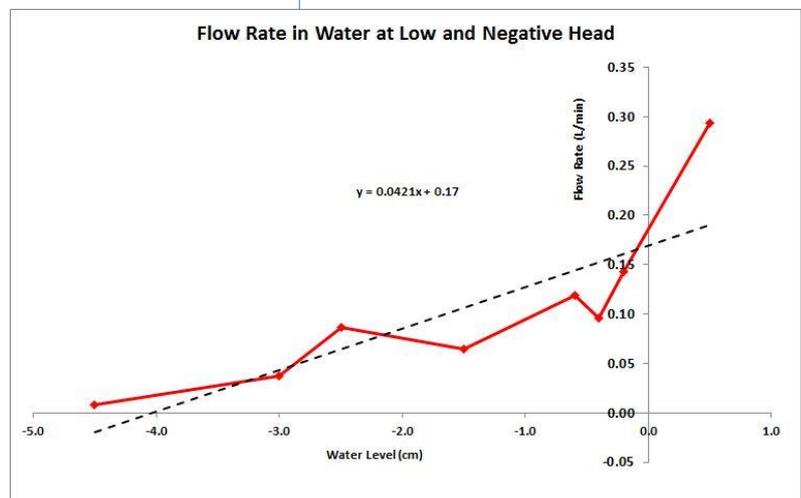
Flow rates with Capiphon depend on the orientation of the belt – horizontal, vertical, or on an incline - and on the medium – sand, soil or free water.

In Free Water

1. Chinese Research (see 1): **Flow rate 20cm belt at 20cm head 4±10% L/ minute**
2. Australian Research (see 2): **Flow rate 10cm belt in range of 5 to 25cm head is ~200ml/min/cm head.**



Flow rate in the range of **5cm to -4.5cm** is **~3ml/min/cm head** reflecting syphon and capillary forces overcoming surface tension. (10cm belt)



In Direct Contact with Soil

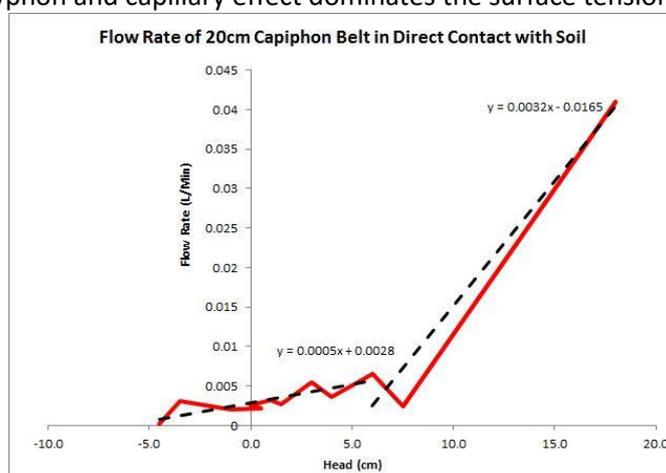
1. Chinese Research (see 1): Flow Reports For Capiphon DrainBelt:

The theoretical flow rate versus measured rate

Type of test	Width (cm)	Soil Permeability (m/sec)	Effective belt area (cm ²)	Theoretical flow rate (L/min)	Measured flow rate (L/min)	Efficiency
Embedded in sand horizontally	20	1.18×10^{-4}	440	0.312	1.04 (H=20cm)	3.33
Embedded in clay horizontally	20	5.00×10^{-6}	440	0.013	0.45 (H=5cm)	34.6
Embedded in clay vertically	17	5.00×10^{-6}	900	0.027	1.80 (H=15cm)	66.6

Note: Theoretical flow rate is calculated from soil permeability and area of belt in contact with the soil, and is due to gravity alone. Measured flow rate includes capillary and syphon forces.

2. Australian Research (see 2): Flow rate 20cm belt is approximately **3.2ml/min/cm head in the range of 185cm to 10cm head** reflecting the permeability of the soil, and **0.5ml/min in the range 5cm to -4.5cm head** as the syphon and capillary effect dominates the surface tension in the soil.



In Intercept Drains with Coarse Sand Back-fill

In many situations, Capiphon is installed as small lengths (25-50cm of 10cm wide belt) inserted vertically at, say, 50cm intervals into a smooth PVC discharge pipe laid in a narrow trench and back-filled with coarse sand. In these situations, the flow rate into the discharge pipe is dependent on the area of the strips of belt, and the permeability of the sand.

References:

- Fenn, G.R. (2012), 'Drainage Characteristics of Capiphon Belt and Capiphon Pipe - Some Comparisons with slotted pipe with sock', International Commission on Drainage & Irrigation. 63rd IEC/ 7th Asian Regional Conference, June 2012, Adelaide
- Lau ChingBo Chinese Institute of Water Resources & Hydroelectric Power: "Flow Reports For Capiphon DrainBelt".