

Darcy's Law

How fast water moves through soil.

Civil Engineering

Flow through soil is proportional to the hydraulic gradient, with permeability as the constant.

$$v = ki \cdot Q = kiA \cdot i = \Delta h/L$$

k 0.00001, i 0.02

Darcy velocity.

v = 0.2 μ m/s

Clean gravel

Free draining.

k above 10 mm/s

Intact clay

Nearly a barrier.

k below 1 nm/s

THE COMMON MISTAKE

✗ **Reading v as the speed of the water**

✓ **Divide by porosity for that**

Darcy velocity is discharge spread over the whole cross-section. Water actually travels through the voids only, at roughly v divided by porosity.

Educational reference. Darcy assumes laminar flow in a saturated, uniform soil. Field permeability can vary by orders.