ValveCapillary:

The **capillary effect** describes the behavior of liquids in capillaries, i.e. sufficiently narrow tubes, gaps or cavities with non-deformable surfaces made of solids. This is determined by the surface tension of the liquid (cohesion) and the interfacial tension between the liquid and the solid surface (adhesion) or the wettability of the solid surface with the liquid. Since the weight of the liquid is low in narrow cavities, capillary force outweighs gravity and helps trees, for example, allow water to rise up to 100 meters from the roots.
The capillary effect fills the capillary according to the law of rise height h:

$$h = 2*\sigma*\cos(\theta) / (\varrho*g*r)$$

h = climbing height; σ = surface tension; θ = contact angle; ϱ = density;
g = acceleration due to gravity; r = radius.

Gravity pressure is the pressure that a body experiences only due to the weight of the liquid or gas column above it. The following applies to the gravity pressure P:
$P = \varrho*g*h$
The gravity pressure is independent of the shape and cross-sectional area of the liquid column.

Surface tension is the phenomenon that occurs in liquids as a result of molecular forces to keep their surface small. This effect, for example, is what causes water to form droplets and contributes to the ability of some insects to walk on water and the ability of a razor blade to "float" on water.
The surface tension (formula symbol: σ, γ) is an interfacial tension that occurs between liquids and gas phases. It is measured in the SI units N/m.

Surface tension of water at 20°C = 72.75 mN/m.

The valve capillary sucks the liquid by the capillary effect of the rising height (2), which depends on the diameter of the capillary whereby the valve/membrane (3), which bridges the capillary effect, is closed (otherwise a capillary will only fill up to below the upper opening or a side opening, despite the riser being greater than the length of the pipe). Then the valve/membrane (3) opens in order to divert the liquid at the outlet (5) at a higher level due to the resulting gravity pressure P (4). Then the valve/membrane (3) closes and new liquid is sucked in by the capillary effect... .
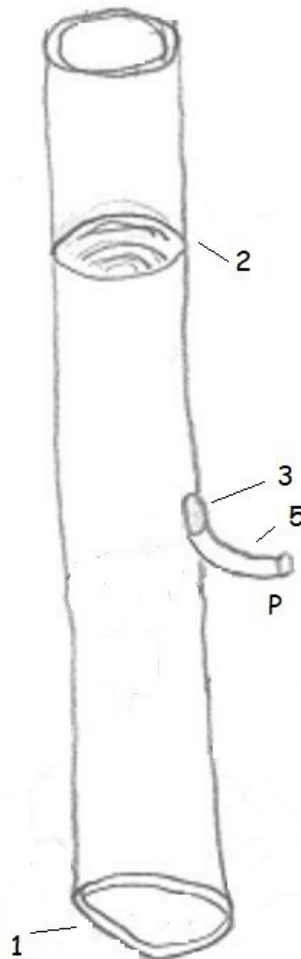
Sketch 1: Valve capillary consisting of capillary(1),
Rise height h (2), valve (3), gravity pressure P (4), outlet (5)