How do I calculate plug length in Capillary Electrophoresis?

One possible way is to use the "Poiseuille equation" to calculate the plug length:

$V = (\Delta P\, d^4\, \pi\, t)/(128\, \eta\, L)$

where V is volume of the injected plug, ΔP is pressure drop down the length of the capillary (pascals), d is the inside diameter (m), η is the fluid viscosity (Pascal-sec), t is time the pressure is applied (sec), and L is the length of the capillary (m). Here you solve for V to get the injected plug volume. From there, you simply use the cylinder volume equation to convert volume to length of the plug:

$V = \pi\, r^2\, L_{plug}$

$L_{plug} = (V / (\pi\, r^2))$

$L_{plug} = (V / (\pi\, (d/2)^2))0$

where r is the inside radius and L_{plug} is the length of the plug.