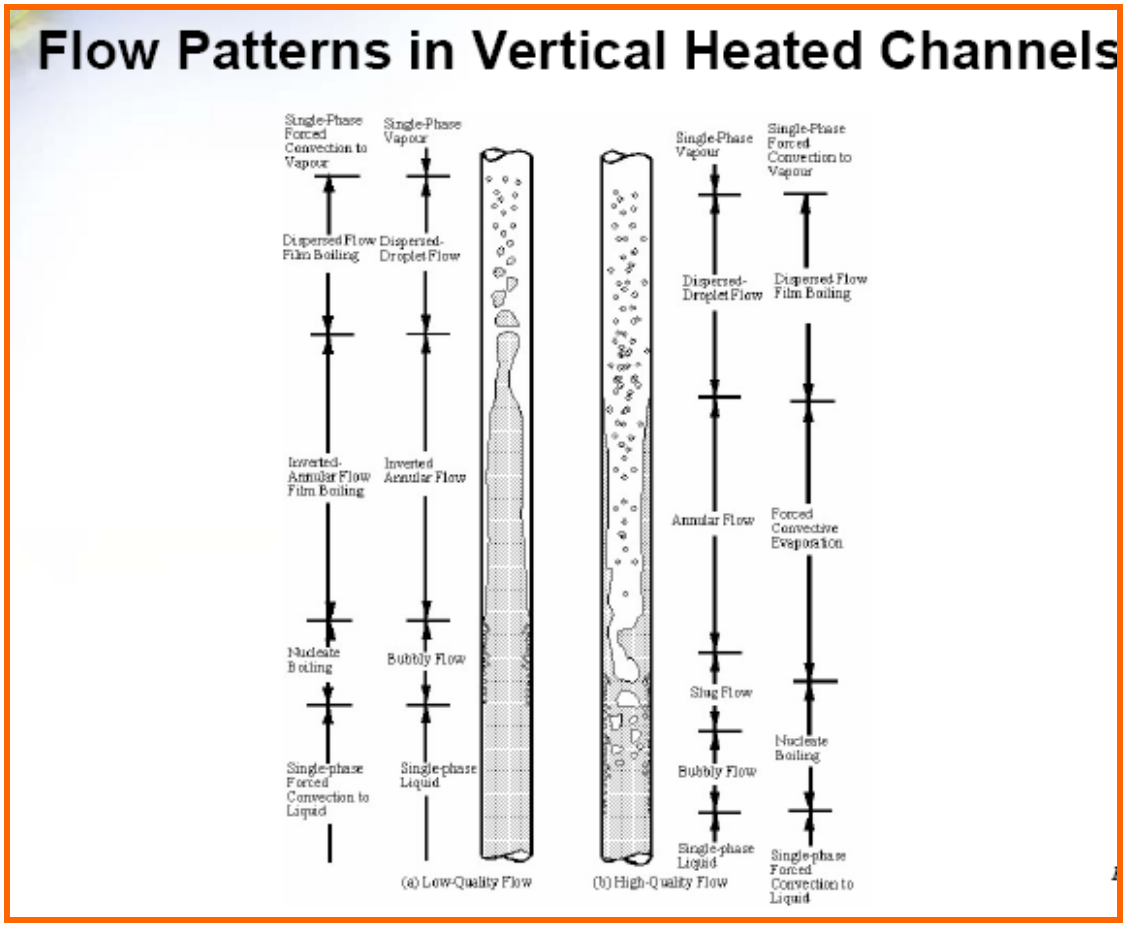
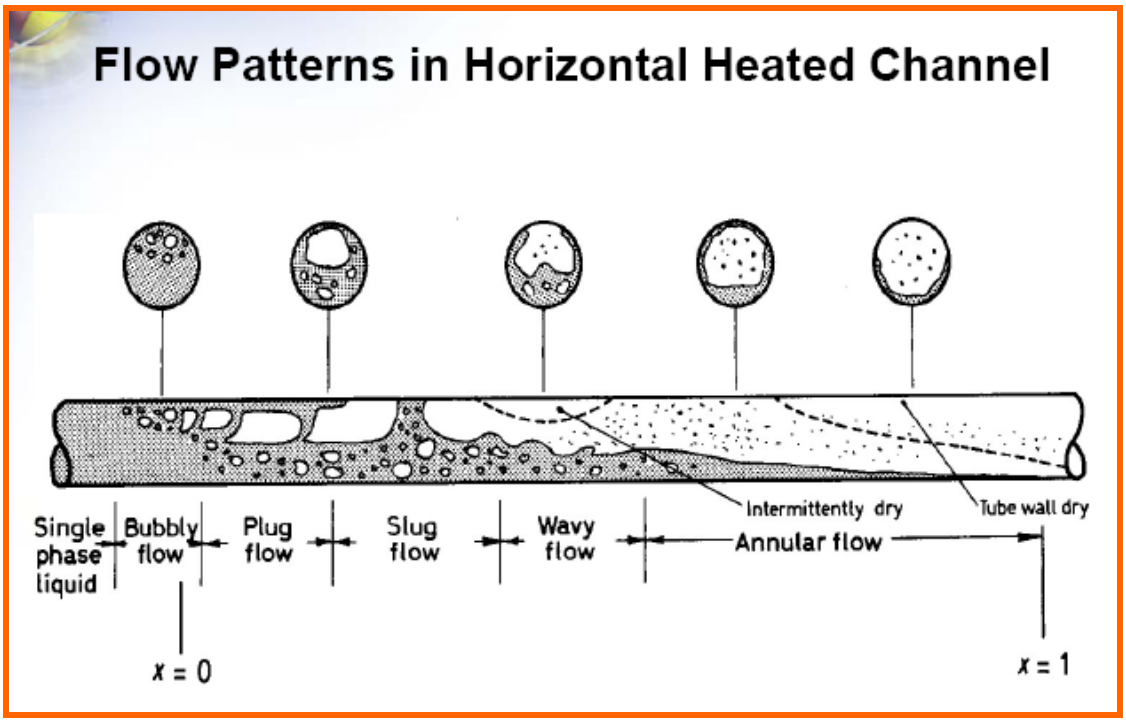
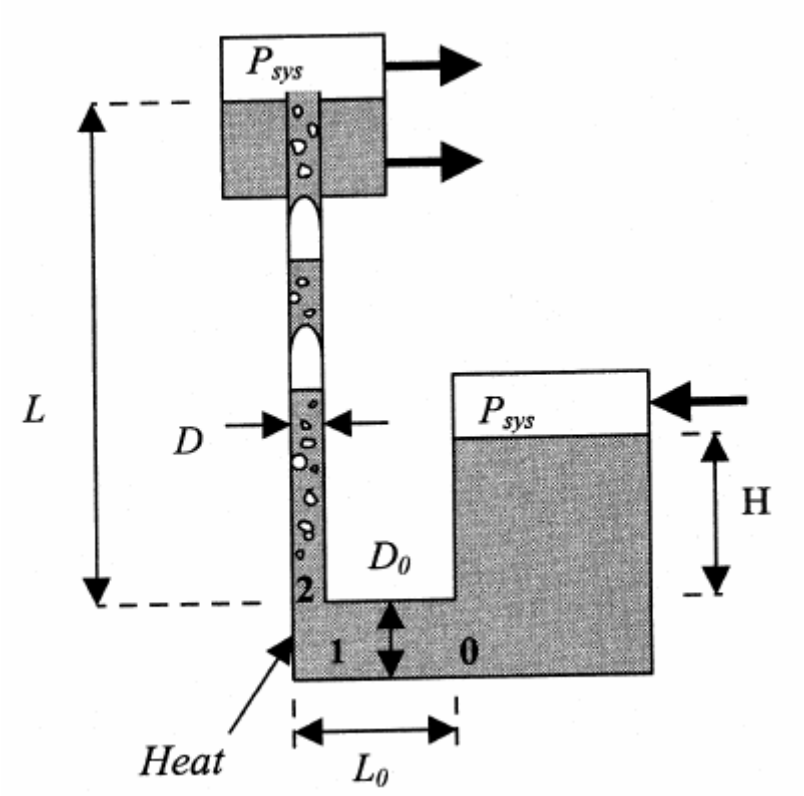

Flow Patterns in Vertical Heated Channels
Single-Phase Forced Convection to Vapour
Dispersed Flow Film Boiling
Inverted-Annular Flow Film Boiling
Nucleate Boiling
Single-phase Forced Convection to Liquid
Single-Phase Vapour
Dispersed-Droplet Flow
Inverted Annular Flow
Bubbly Flow
Single-phase Liquid
(a) Low-Quality Flow
Single-Phase Vapour
Dispersed-Droplet Flow
Annular Flow
Slug Flow
Bubbly Flow
Single-phase Liquid
Single-Phase Forced Convection to Vapour
Dispersed Flow Film Boiling
Forced Convective Evaporation
Nucleate Boiling
Single-phase Forced Convection to Liquid
(b) High-Quality Flow


Flow Patterns in Horizontal Heated Channel
Single phase liquid
Bubbly flow
Plug flow
Slug flow
Wavy flow
Annular flow
Intermittently dry
Tube wall dry
x = 0
x = 1

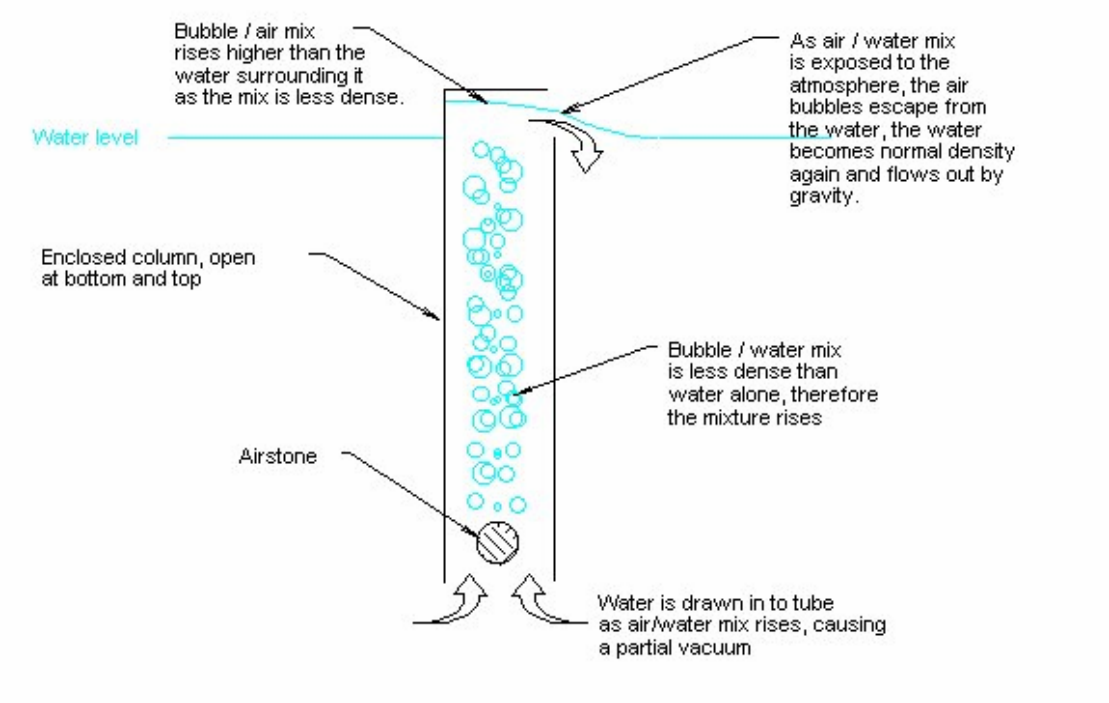
Coffee Maker



نمونه ای از Bubble Pump که حرارت در پایین لوله باعث تبخیر قسمتی از مایع شده و حباب ایجاد شده سبب سبک شدن مایع و بالا رفتن آن در لوله میگردد.

Air Lift Pump

پمپهای از نوع Air Lift نیز از این مکانیزم دو فازی شدن جریان مایع جهت انتقال استفاده میکنند با این تفاوت که در این پمپها با دمیدن هوا جریان دو فازی ایجاد میشود.



Air Lift calculation

Maximum water flow from an airlift pump

Limitations of calculation *(outwith these parameters the calculations will become less accurate):*

Pipe diameter 1.5 - 8cm

Pipe length 60 - 300 cm

$$Q = ((0.758 \times (\%s)^{1.5} \times h_t^{0.33}) + 0.01196) \times d^{2.2}$$

Where ;

Q	=	Water flow rate, litres per minute
h_t	=	Total length of pipe (cm)
d	=	diameter of pipe (cm)
%s	=	Percent of pipe under water (measured from point of diffuser to discharge)

Air requirements for optimal water flow are typically 8-9% of the water volume. Above 10%, normal bubble flow ceases and the efficiency of the airlift drops rapidly