CH2407 Process Equipment Design II

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# Distillation Columns



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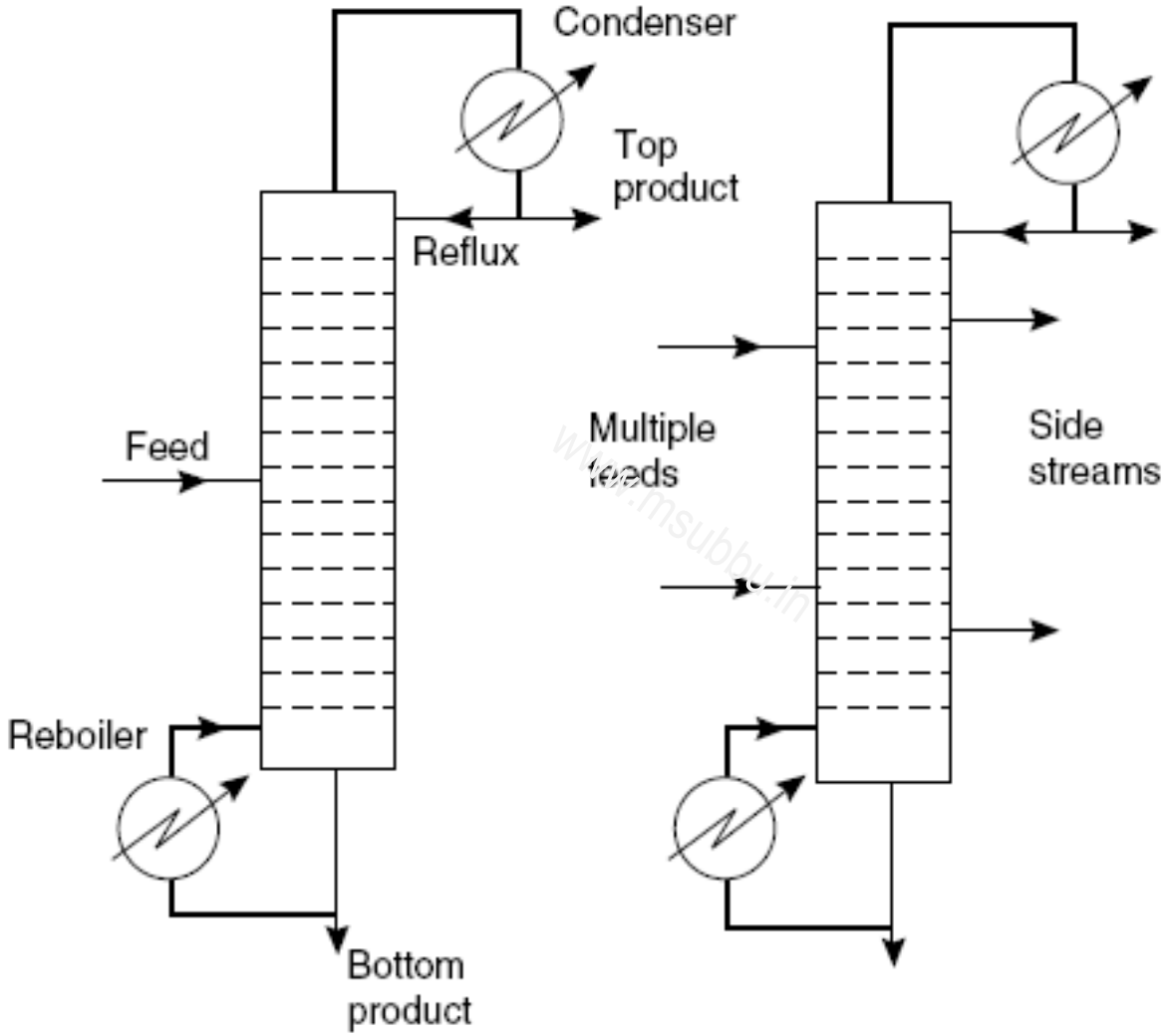


(a) Basic Column (b) Multiple feeds and side streams


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Liquid Air cold box (Distillation Column). Its exterior is basically a metal casing stuffed with insulating materials such as wool


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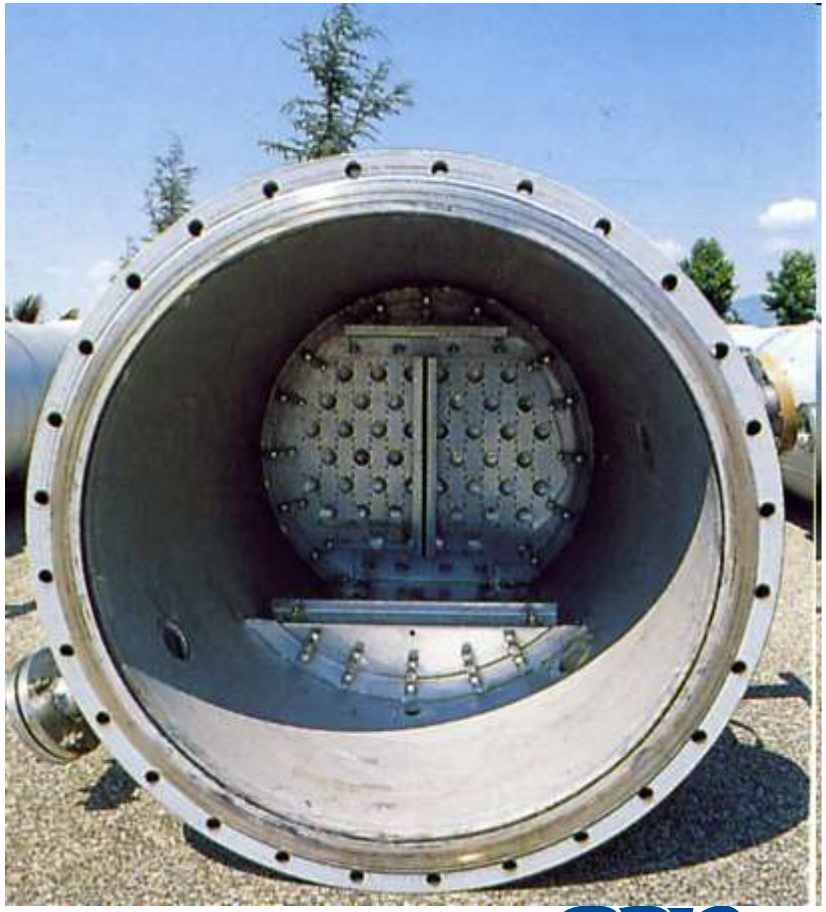
Distillation column D = 1500 mm H=28000 mm


Distillation column D = 1400 mm H=34000 mm


Distillation column D = 1400 mm H=32000 mm


**This sieve tray column, made of nickel alloy, is 10(ft) in diameter and 95(ft) high.**



# Sieve Tray


# Bubble-cap Tray

# Valve Tray


32 Inch Column with tray and downcomer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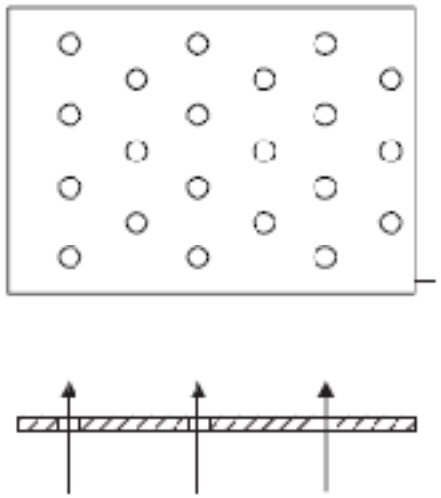
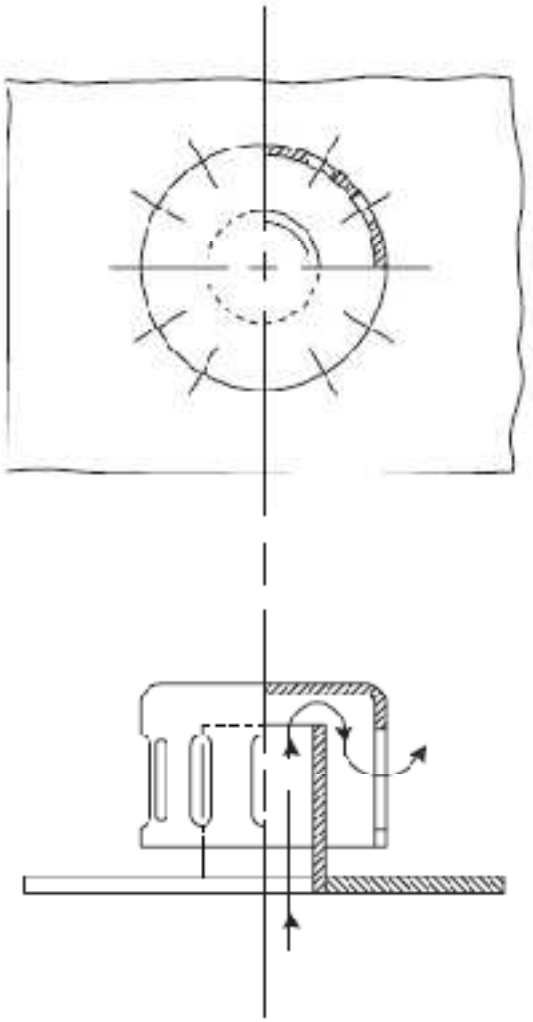
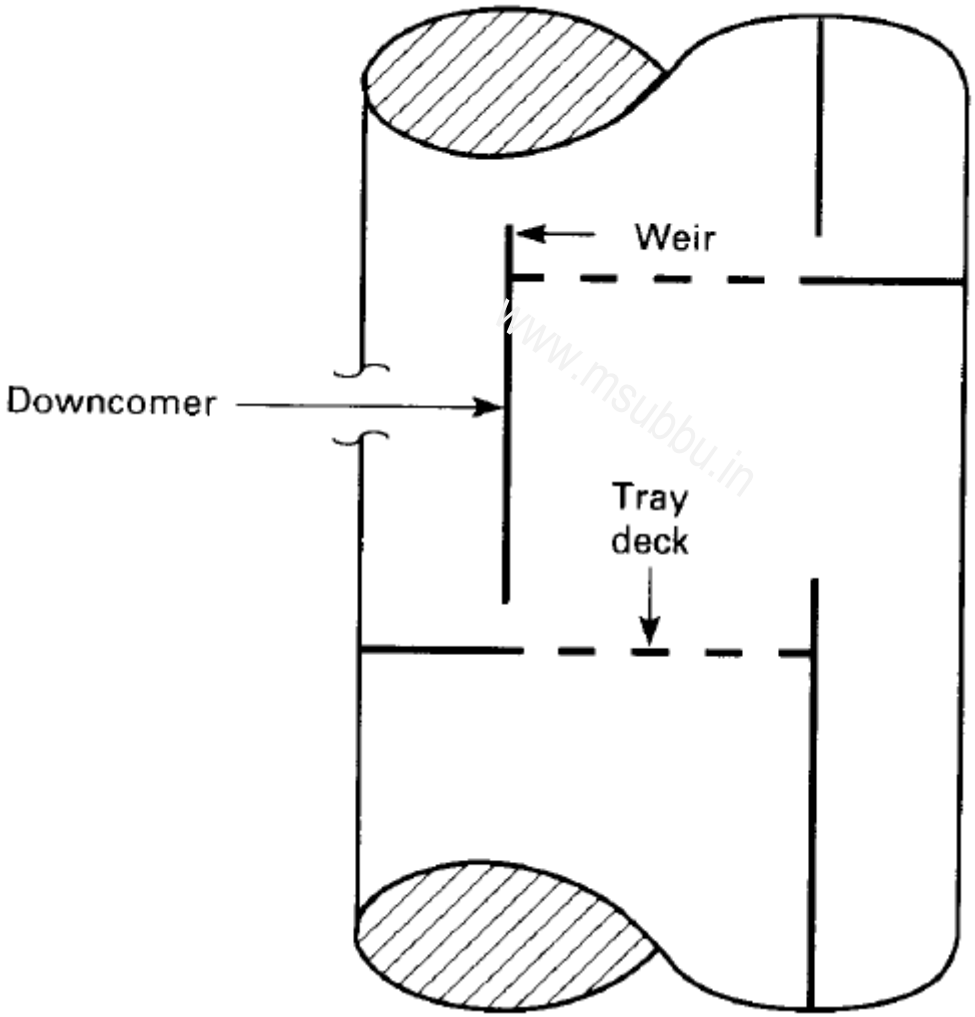


Sieve plate

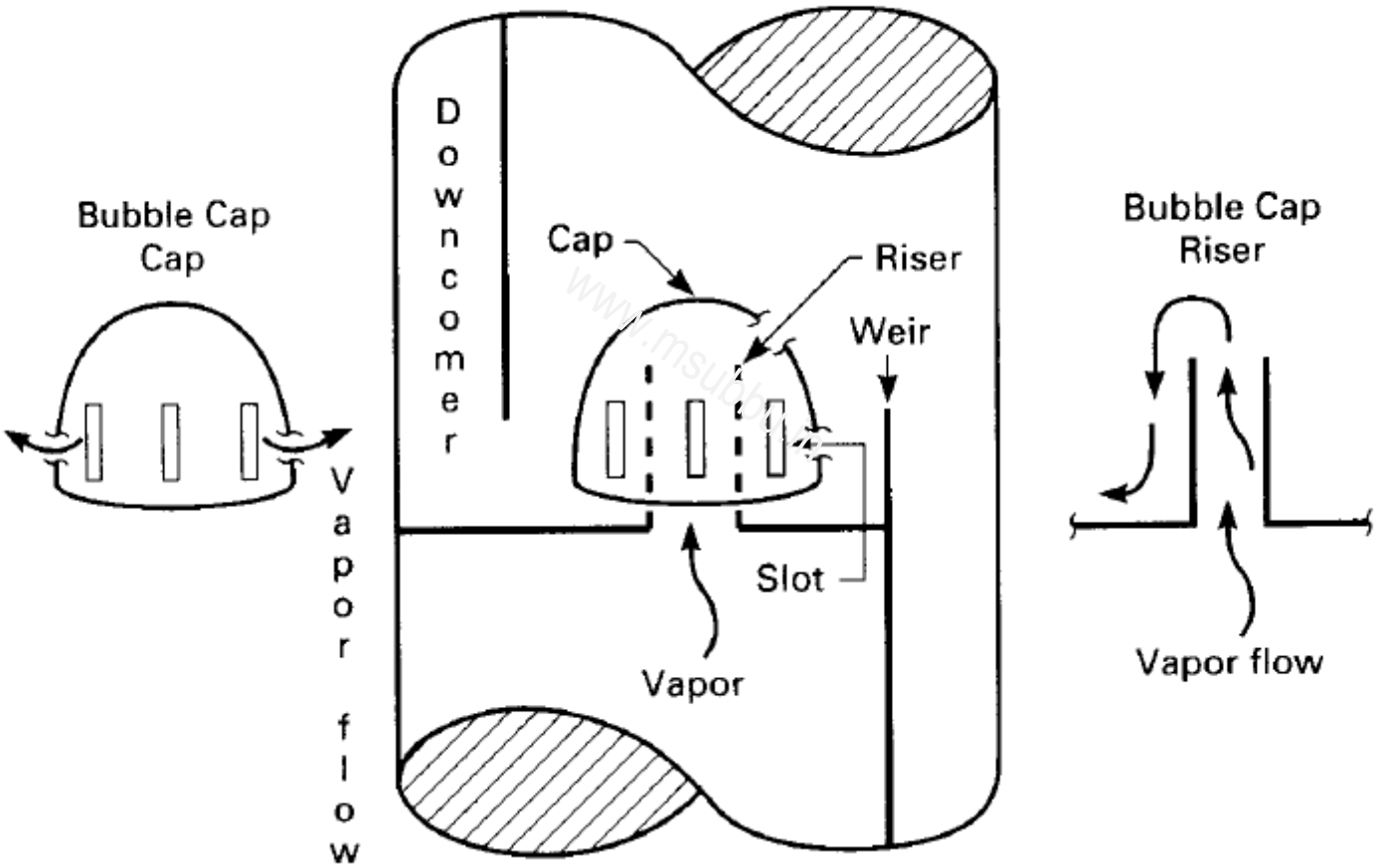


Bubble cap

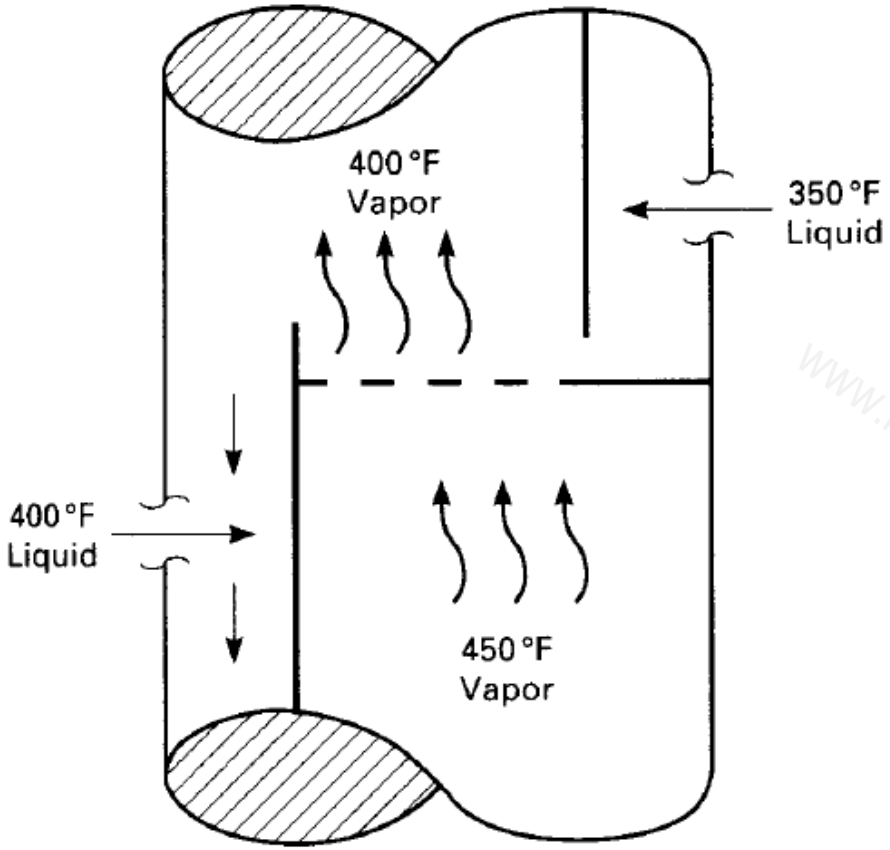
# Perforated Tray



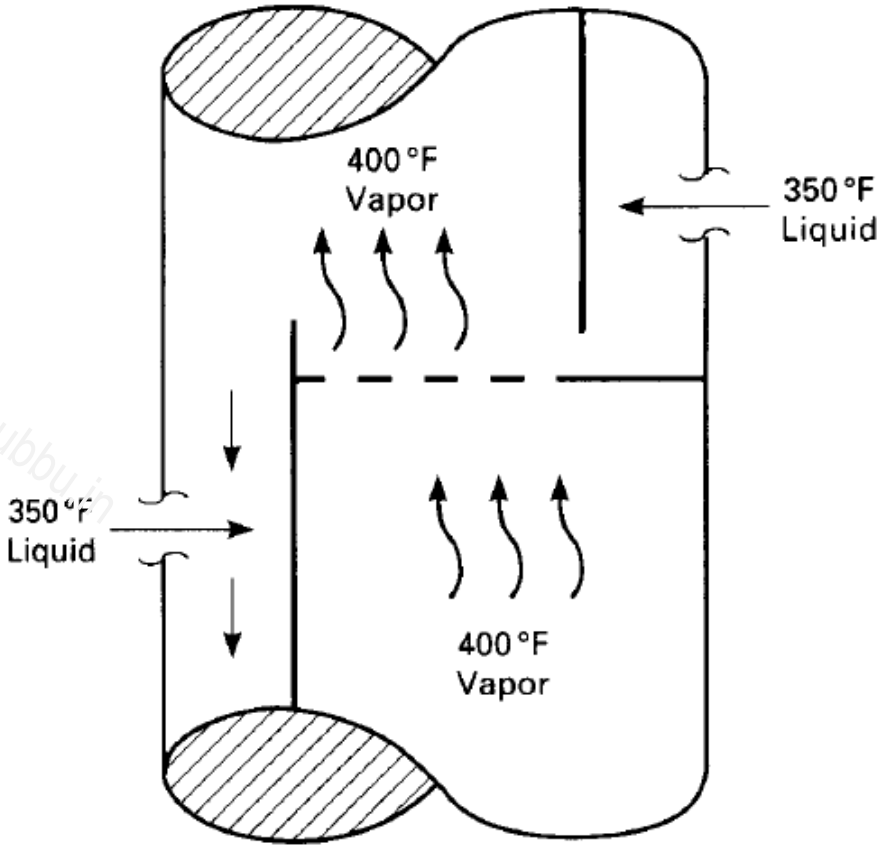
# Bubble-cap in Operation



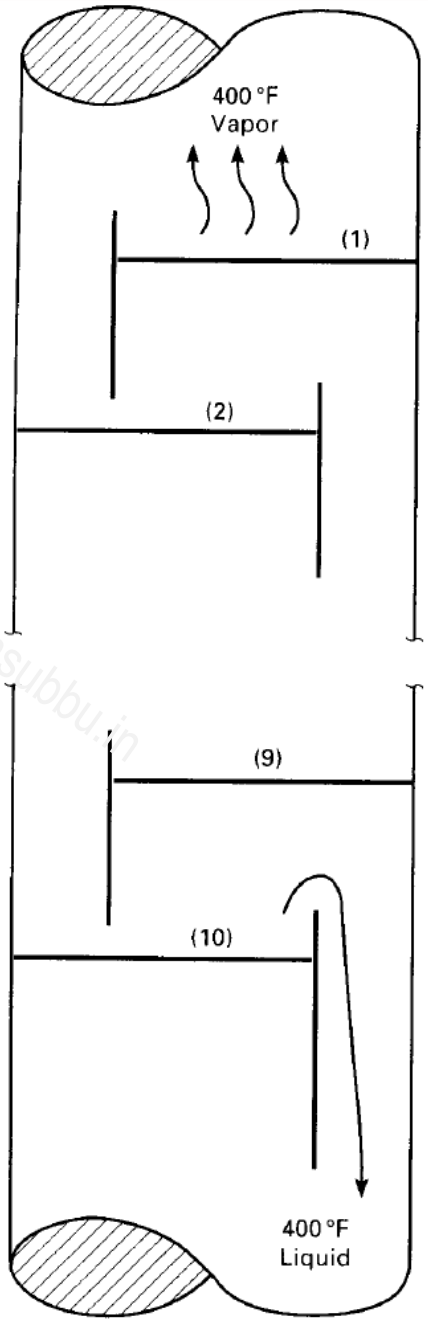
# Tray Efficiency




η = 100%



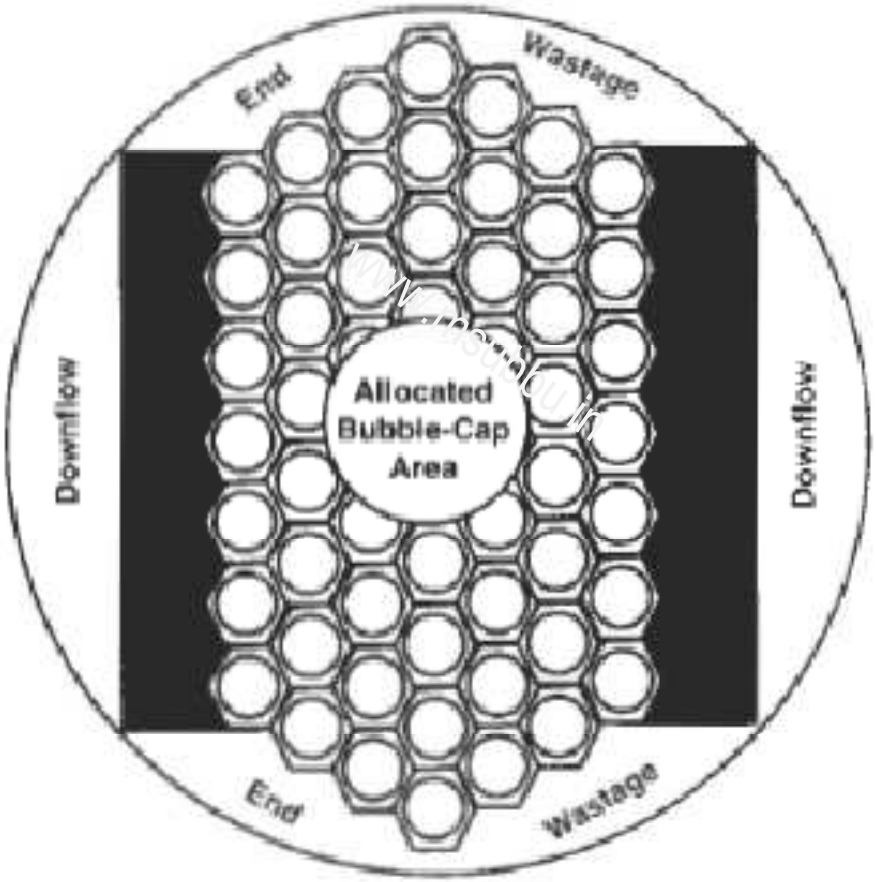

η = 0%



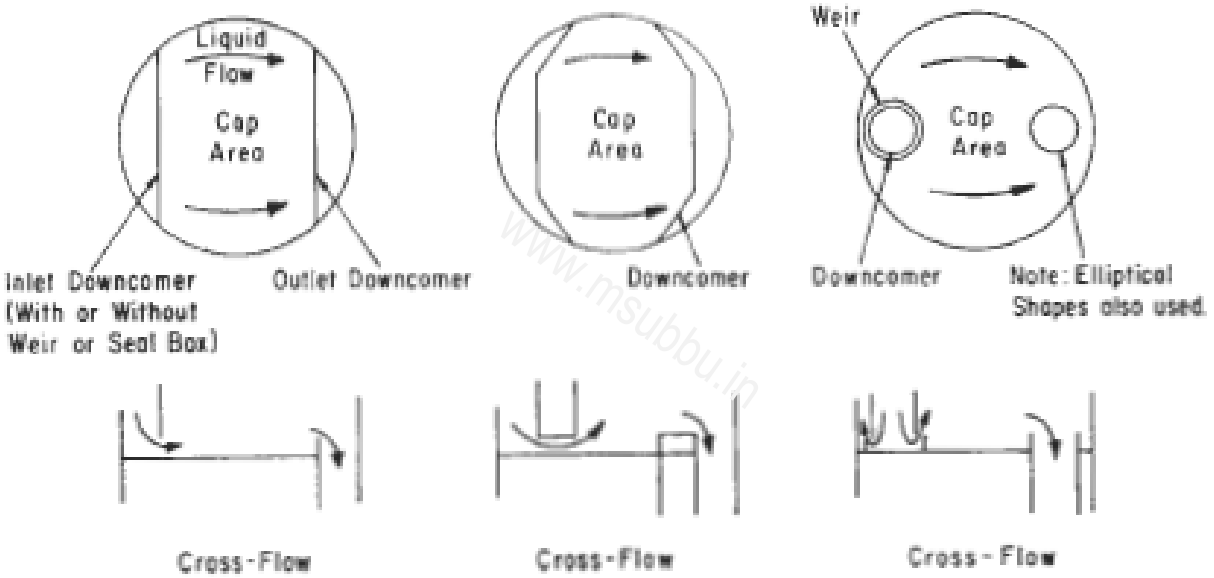



Average η per tray = 10%

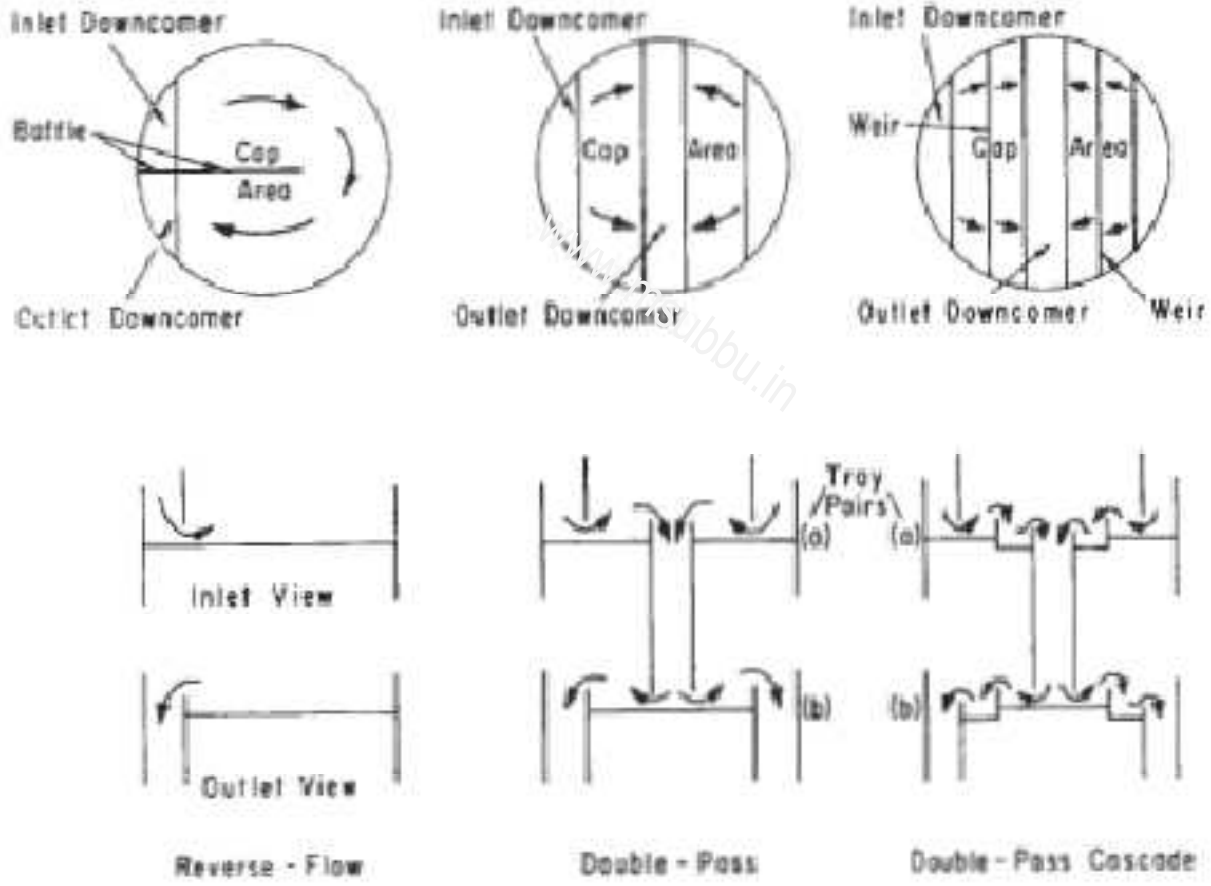
# Tray Area


End
Wastage
Downflow
Allocated
Bubble-Cap
Area
Downflow
End
Wastage

# Tray types by liquid paths



# Tray types by liquid paths (contd.)



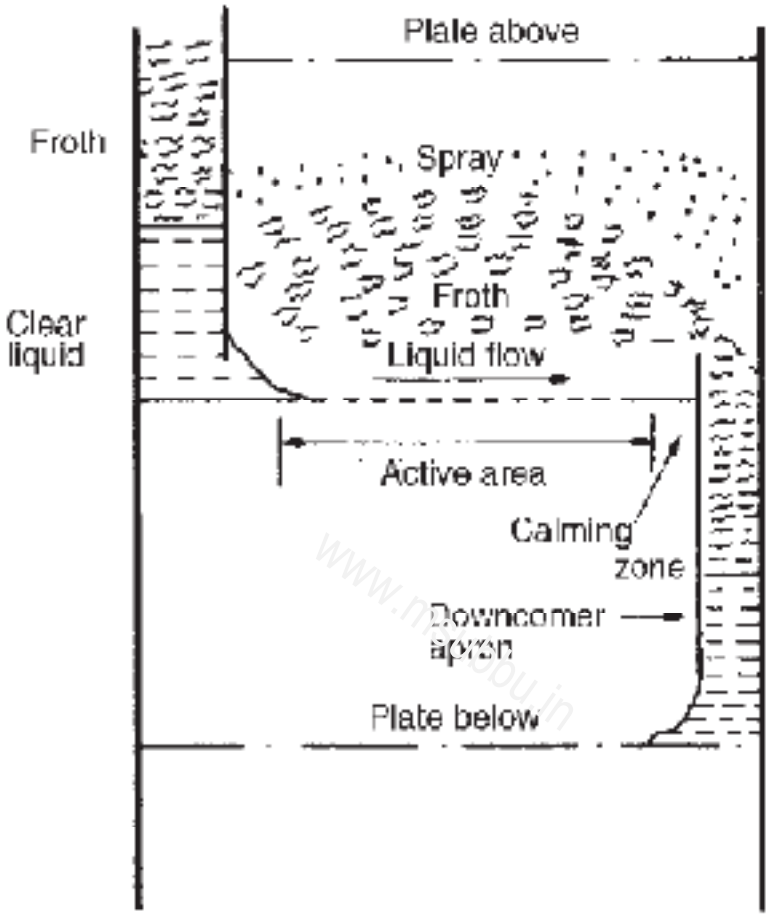



Figure 11.17. Typical cross-flow plate (sieve)

Cross-flow plates are the most common type of plate contactor used in distillation and absorption columns. In a cross-flow plate the liquid flows across the plate and the vapour up through the plate.

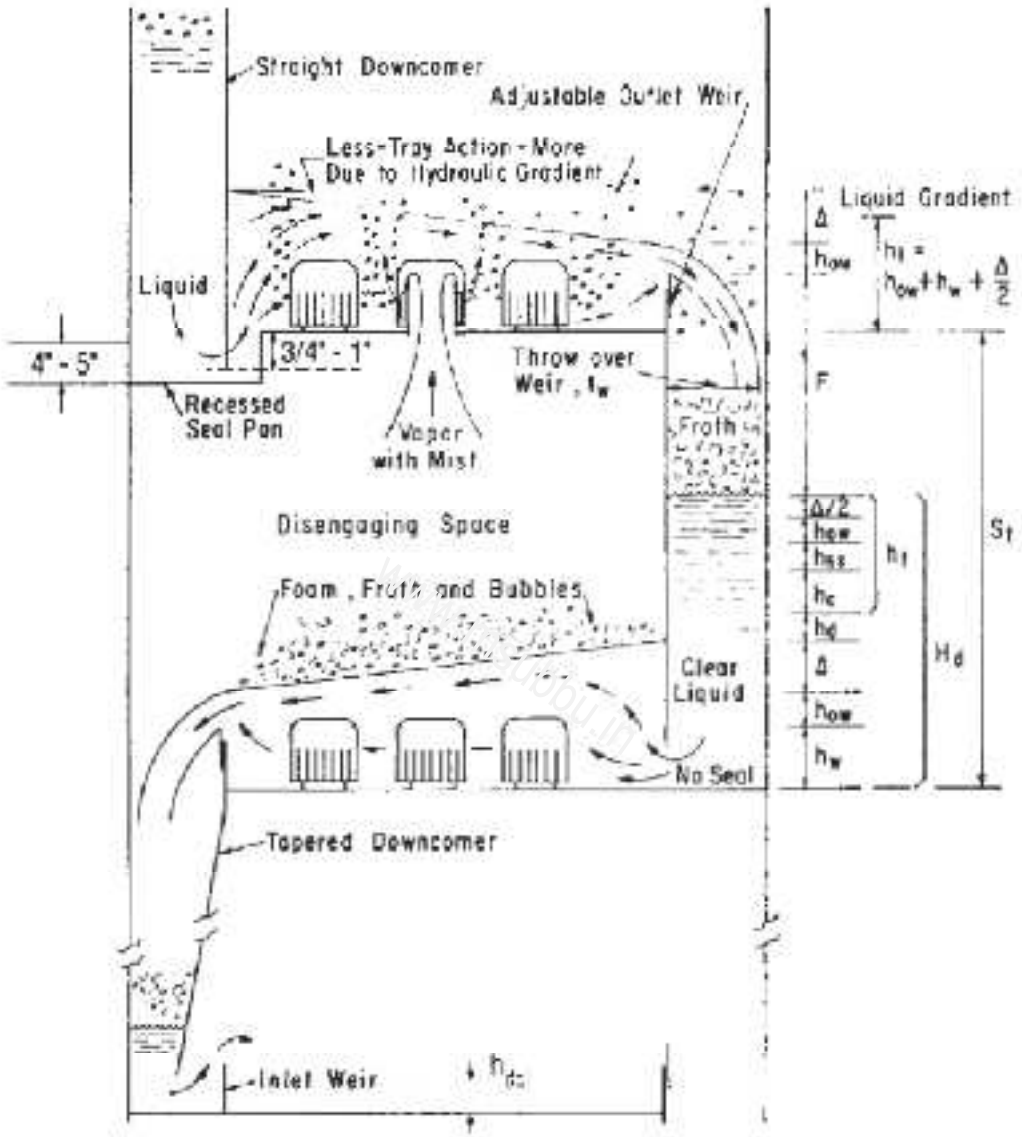
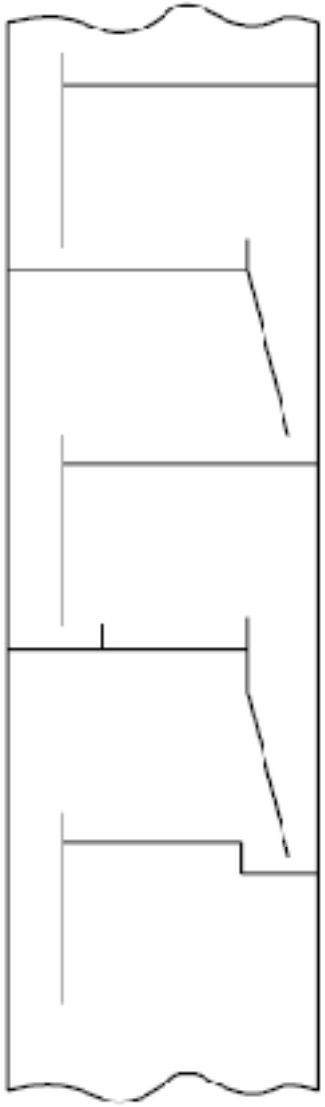



**Figure 8-63.** Bubble cap tray schematic—dynamic operation.

# Downcomer - designs



(a) Vertical apron

(b) Inclined apron

(c) Inlet weir

(d) Recessed well

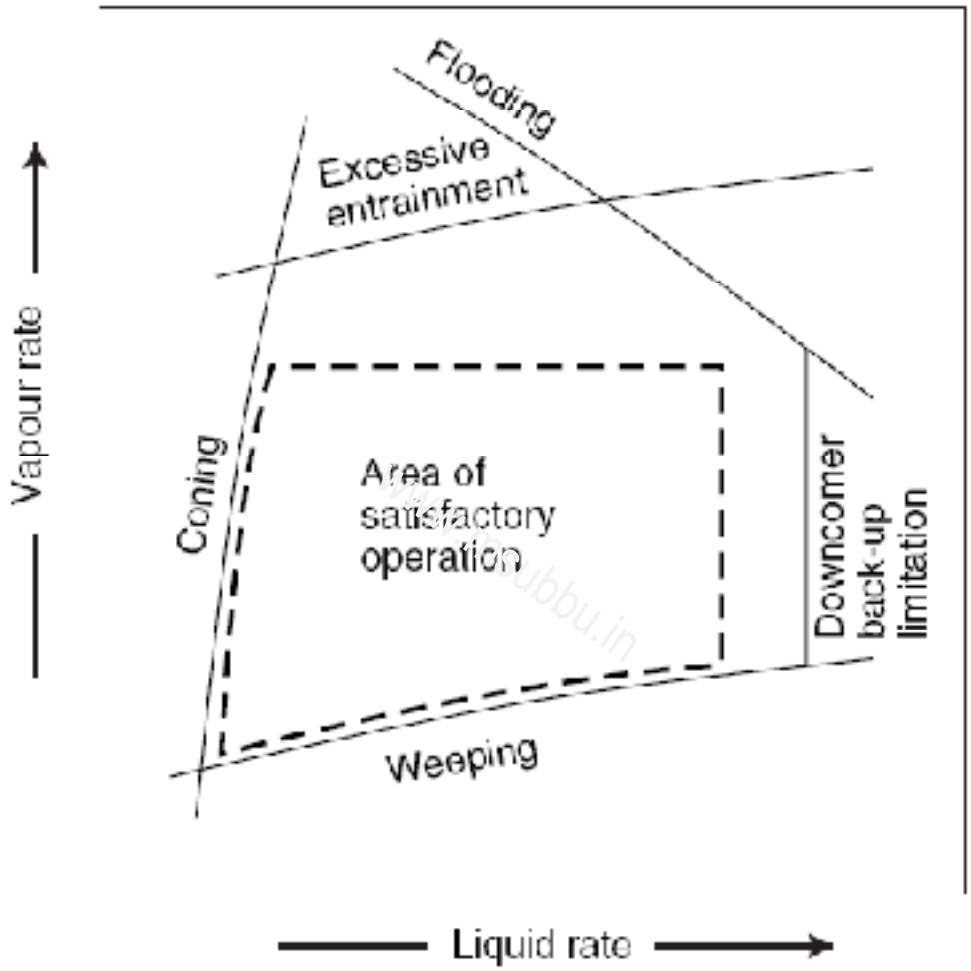
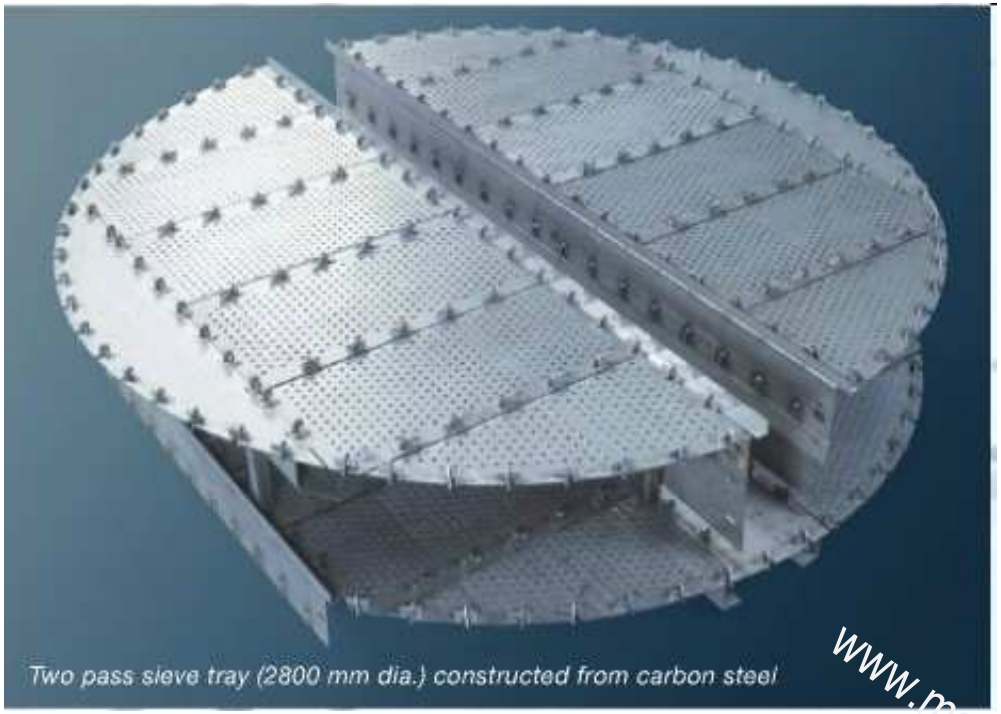
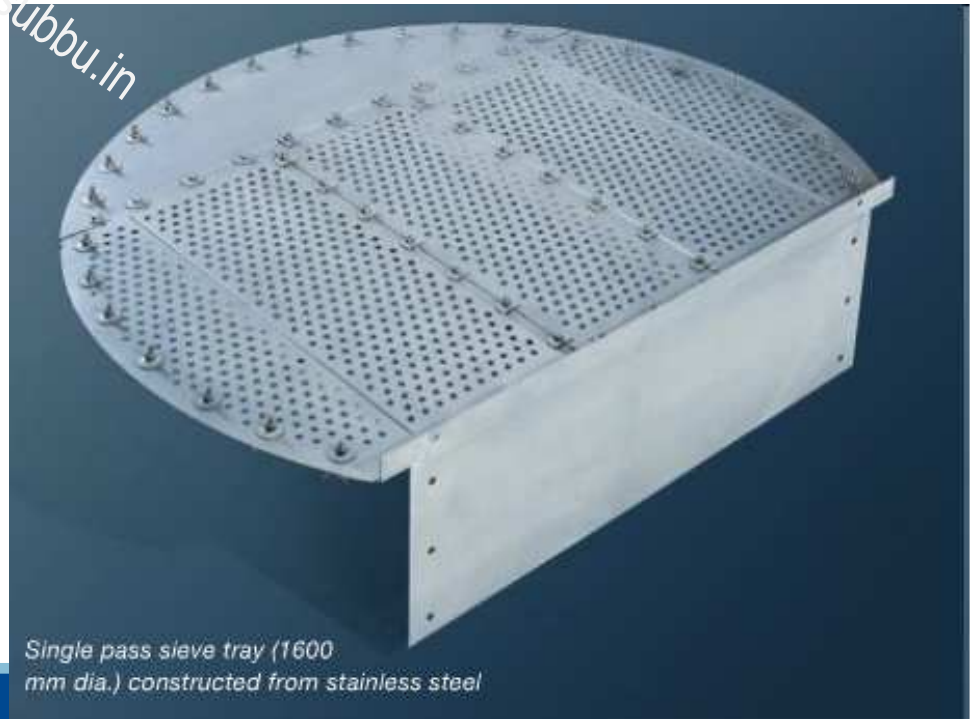



Figure 11.26. Sieve plate performance diagram



Two pass sieve tray (2800 mm dia.) constructed from carbon steel





Single pass sieve tray (1600 mm dia.) constructed from stainless steel


Sieve tray

Valve tray



Bubble cap tray