# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Design Discussion</td>
<td>5</td>
</tr>
<tr>
<td>System Factors</td>
<td>6</td>
</tr>
<tr>
<td>Design Rating Procedures</td>
<td>6-10</td>
</tr>
<tr>
<td>A. Tray Space Factors</td>
<td>6</td>
</tr>
<tr>
<td>B. Preliminary Sizing</td>
<td>7</td>
</tr>
<tr>
<td>C. Detailed Sizing</td>
<td>8</td>
</tr>
<tr>
<td>D. Pressure Drop</td>
<td>10</td>
</tr>
<tr>
<td>Example Problems</td>
<td>11-12</td>
</tr>
<tr>
<td>Charts</td>
<td></td>
</tr>
<tr>
<td>Koch FLEXITRAY Tower Sizing</td>
<td>13</td>
</tr>
<tr>
<td>Downcomer Sizing</td>
<td>14</td>
</tr>
<tr>
<td>FLEXITRAY Capacity</td>
<td>15</td>
</tr>
<tr>
<td>Chord Height/Downcomer Area Data</td>
<td>16-17</td>
</tr>
<tr>
<td>Chord Height/Chord Length Data</td>
<td>18-19</td>
</tr>
<tr>
<td>Downcomer Hydraulic Chart</td>
<td>20</td>
</tr>
<tr>
<td>Dry Tray Pressure Drop</td>
<td>21</td>
</tr>
<tr>
<td>Effective Depth of Liquid (1&quot; Weir Height)</td>
<td>22</td>
</tr>
<tr>
<td>Effective Depth of Liquid (1½&quot; Weir Height)</td>
<td>23</td>
</tr>
<tr>
<td>Effective Depth of Liquid (2&quot; Weir Height)</td>
<td>24</td>
</tr>
<tr>
<td>Effective Depth of Liquid (2½&quot; Weir Height)</td>
<td>25</td>
</tr>
<tr>
<td>Effective Depth of Liquid (3&quot; Weir Height)</td>
<td>26</td>
</tr>
<tr>
<td>Arrangement of Trays and Nozzles</td>
<td>27-29</td>
</tr>
<tr>
<td>Mechanical Specifications for Valve Trays</td>
<td>30</td>
</tr>
<tr>
<td>FLEXITRAY Rating Sheet</td>
<td>31</td>
</tr>
</tbody>
</table>
KOCH FLEXITRAY®
DESIGN AND RATING PROCEDURE
INTRODUCTION

The FLEXITRAY® is a valve type tray having liftatable valves, approximately 2 inches in diameter, which operate like check valves. These valves have a limited lift and are spaced on 3 to 6 inch centers. The capacity of the FLEXITRAY exceeds that of a well designed sieve tray and maintains almost constant tray efficiency over a wide operating range.

There are basically two variations of the valve assembly, type "T" and type "A." The "T" assembly has a movable valve contained by a four-legged hold-down cage attached firmly to the tray deck. The "A" assembly is a movable round valve with integral guide legs and lift stops.

The FLEXITRAY is available with several valve designs for specific purposes as shown below.

<table>
<thead>
<tr>
<th>Valve Type</th>
<th>Tray Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;A&quot;</td>
<td>With type &quot;A&quot; valve assembly and standard hole in tray floor.</td>
</tr>
<tr>
<td>&quot;A₀&quot;</td>
<td>With type &quot;A&quot; valve assembly and a special shaped contoured hole in the tray floor for lower dry tray pressure drop than the standard hole.</td>
</tr>
<tr>
<td>&quot;T&quot;</td>
<td>With type &quot;T&quot; valve assembly and a standard hole in tray floor. This type valve has been used successfully for many years in the dirtiest of services including slurries. It is also the preferred choice for corrosive services.</td>
</tr>
<tr>
<td>&quot;T₀&quot;</td>
<td>With type &quot;T&quot; valve assembly and a special shaped contoured hole in the tray floor for lower dry tray pressure drop than the standard hole.</td>
</tr>
<tr>
<td>&quot;S&quot;</td>
<td>With valve punched up in tray deck, yet still attached, making it a stationary assembly.</td>
</tr>
</tbody>
</table>
INTRODUCTION (cont.)

All types, excluding type "S," have equal capacity and a wide operating range. Usually two weights of valves are used on type "A" and "T" trays. The different valve weights alternate in rows parallel to the outlet weir and insure vapor distribution at lower vapor rates. The lighter valves open during the first 20-30% of tray capacity and the heavier valves open from 30-70% capacity. At higher rates, all valves are fully open. Because there is no measurable hydraulic gradient, a uniform vapor flow exists over the entire tray.

The many advantages of the FLEXITRAY compared to other trays are:

1. The FLEXITRAY has a high capacity for a given tower size. The FLEXITRAY exhibits lower entrainment than sieve trays because of the horizontal flow of vapor from the valves.

2. The FLEXITRAY has higher efficiency over a wider operating range. The horizontal vapor flow from the valves, distributed around the 360° valve perimeter at deck level, promotes maximum mixing with the liquid. Greater efficiency permits reduction of the reflux ratio for a given tower diameter or allows a smaller tower diameter for a given feed rate.

3. The FLEXITRAY is less sensitive to "out-of-levelness" than other tray types. Froth on the tray extends down to the deck in contrast to the geysers of froth on a sieve tray. This reduces the hydraulic imbalance.

4. The FLEXITRAY permits longer run lengths in fouling services because the horizontal radial vapor flow at the tray floor eliminates "dead spots" where solids may settle, polymer growth can start or decomposition (cooking) can occur. The type "T" valve tray is especially suited to these situations.

5. The FLEXITRAY has been in commercial use since 1952 in tens of thousands of installations. They have replaced bubble cap trays as a standard of performance and are accepted today as the proven performer in all liquid-vapor contacting applications.
KOCH FLEXITRAY®
TYPICAL 4'-0" SINGLE FLOW TYPE "A"
DESIGN DISCUSSION

Capacity Limitations

The capacity limitations of a tray may be caused by either flooding or blowing.

Flooding occurs when the downcomers fail to carry away the required amount of liquid and the excess liquid fills the trays; resulting in loss of bottoms product, low tray efficiency, sharply increased pressure drop, insensitivity to control, etc. With a properly proportioned tray, flooding will be initiated by jetting, i.e., the top of the vapor-liquid contacting mass of large droplets will reach the tray above, resulting in massive entrainment which will in turn cause high pressure drop, high liquid recycling and flooding. If the downcomer is too small or the tray pressure drop is too high, the tray will flood prematurely by downcomer backup, even though the height of the contacting mass would otherwise be low and entrainment negligible.

Blowing is the opposite of flooding in that the liquid is blown into a fine spray leaving the tray essentially dry. The resulting lack of contacting severely reduces tray efficiency. Blowing occurs only at a very high vapor-to-liquid ratio. The vapor velocity vector exiting the FLEXITRAY is directed horizontally rather than vertically as with sieve trays. Therefore, chances of "blowing" are greatly reduced when using the FLEXITRAY. "Picket fence" weirs are recommended to maintain a minimum weir loading of 5 GPM/ft.

Weir Height

A 3' weir height is normally used in pressure columns with 24" tray spacing. Little difference has been found in tray efficiency with weir heights varying from 1 1/2" to 3"; however, a minimum weir height of 2" is recommended for all services except vacuum towers, where a 1" minimum weir height is recommended.

If more weir length is needed than is provided by the weir of a segmental downcomer, consider a swept-back weir.

The downcomer clearance is usually 1/2" less than the height of the outlet weir, although trays with unusually high liquid rates have been designed where the clearance is greater than the height of the weir. At low design liquid rates, 3/4" to 1" clearance should be used to reduce column start-up time.

Tray Spacing

The choice of tray spacing is a function of desired tower length-to-diameter ratio, maintenance access and process load considerations. When a drawoff sump is required, special consideration should be given to the vapor-liquid disengaging space between the floor of the sump and the downcomer of the tray below. When the depth of a full chord sump exceeds 20 percent of the tray space, the tray capacity must be derated by reducing the effective tray space or additional tray spacing must be provided. The preferred tray spacing is generally specified by the customer. Tray spacing of 24" is considered normal and is standard for Charts A and C, discussed later in the design procedure.

Internal piping should be avoided where possible. If internal piping must be used, it should be arranged to avoid obstructing froth flow across the tray and maintenance access between the trays.
SYSTEM FACTORS

Systems with foaming tendencies are taken into account by using a factor to derate the capacity of a given tray design. A list of the more common foaming systems and their recommended factor is below:

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorbers (over 0°F)</td>
<td>.85</td>
</tr>
<tr>
<td>Absorbers (below 0°F)</td>
<td>.80</td>
</tr>
<tr>
<td>Amine Contactor</td>
<td>.80</td>
</tr>
<tr>
<td>Vacuum Towers</td>
<td>.85</td>
</tr>
<tr>
<td>Amine Stills (Amine Regenerator)</td>
<td>.85</td>
</tr>
<tr>
<td>H₂S Stripper</td>
<td>.85</td>
</tr>
<tr>
<td>Furfural Fractionator</td>
<td>.85</td>
</tr>
<tr>
<td>Top Section of Absorbing Type Demethanizer/Deethanizer</td>
<td>.85</td>
</tr>
<tr>
<td>Glycol Contactors</td>
<td>.50</td>
</tr>
<tr>
<td>Glycol Stills and Glycol Contactors in Glycol Synthesis Gas</td>
<td>.65</td>
</tr>
<tr>
<td>CO₂ Absorber</td>
<td>.80</td>
</tr>
<tr>
<td>CO₂ Regenerator</td>
<td>.85</td>
</tr>
<tr>
<td>Caustic Wash</td>
<td>.65</td>
</tr>
<tr>
<td>Caustic Regenerator, Foul Water, Sour Water Stripper</td>
<td>.60</td>
</tr>
<tr>
<td>Alcohol Synthesis Absorber</td>
<td>.35</td>
</tr>
<tr>
<td>Hot Carbonate Contactor</td>
<td>.85</td>
</tr>
<tr>
<td>Hot Carbonate Regenerator</td>
<td>.90</td>
</tr>
<tr>
<td>Oil Reclaimer</td>
<td>.70</td>
</tr>
</tbody>
</table>

The capacity of a given tray design used in high pressure fractionation service with a vapor density of 1.8 lb. per cu. ft. and higher should be derated by a system factor calculated by the following formula:

\[
\text{system factor} = \frac{1.21}{(d/V)^{0.32}}
\]

DESIGN RATING PROCEDURE

A quick approximation procedure for determining the diameter of a column equipped with the FLEXITRAY, followed by a detailed sizing procedure, is outlined in the following sections. This rating procedure has been in general use for more than 20 years and has proven to be extremely accurate in tens of thousands of installations.

A. Tray Space Factors

Tray space factors to be used with Charts A and C are as follows:

<table>
<thead>
<tr>
<th>Tray Spacing</th>
<th>Vapor Density Less than 1.5 lbs./ft³</th>
<th>Vapor Density Greater than 1.5 lbs./ft³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>0.65</td>
<td>0.65</td>
</tr>
<tr>
<td>15</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>18</td>
<td>0.84</td>
<td>0.84</td>
</tr>
<tr>
<td>21</td>
<td>0.92</td>
<td>0.92</td>
</tr>
<tr>
<td>24</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>27</td>
<td>1.073</td>
<td>1.06</td>
</tr>
<tr>
<td>30</td>
<td>1.142</td>
<td>1.12</td>
</tr>
<tr>
<td>36</td>
<td>1.22</td>
<td>1.15</td>
</tr>
</tbody>
</table>
B. Preliminary Sizing

Chart A provides a quick approximation only of column diameter and should be verified by a detailed design before the column diameter is finalized.

The steps for using Chart A are as follows:

1. Determine the vapor rate in actual cubic feet-per-second (ACFS), the liquid rate in gallons-per-minute (GPM), the vapor and liquid densities in pounds-per-cubic foot, all at actual tower operating conditions of temperature and pressure. Then decide on the tray spacing to be used.

2. Calculate the square root factor,

\[ \sqrt{\frac{d_v}{d_l - d_v}} \]

Where: \( d_v \) = vapor density, lbs./ft\(^3\).

\( d_l \) = liquid density, lbs./ft\(^3\).

3. Calculate the vapor loading factor,

\[ \text{ACFS} \sqrt{\frac{d_v}{d_l - d_v}} \]

4. Correct the vapor loading factor and liquid rate by dividing by the tray space factor and system factor found on page 6.

Corrected vapor load factor = \[ \frac{\text{ACFS} \sqrt{\frac{d_v}{d_l - d_v}}}{(\text{Tray space factor})(\text{System factor})} \]

Corrected liquid rate = \[ \frac{\text{GPM}}{(\text{Tray space factor})(\text{System factor})} \]

5. Plot the corrected vapor loading factor and corrected liquid rate on Chart A.

6. Read the minimum diameter from Chart A, noting that in many cases the minimum diameter will depend on the number of liquid flow passes per tray.

After preliminary diameter, number of liquid passes and tray spacing have been established, a detailed tray design is made and then checked against the capacity correlation.
C. Detailed Sizing

1. Establish vapor and liquid rates as in Steps 1, 2 & 3 of Preliminary Sizing.

2. Size the downcomers. The following sizing method is based on an assumed design loading equivalent to 85% of calculated capacity. If some other design loading is used, the downcomer area should be adjusted accordingly. For most hydrocarbon columns using 24" tray spacing, sizing of the effective area at the top of the downcomer is based on a hot liquid rate of 175 GPM/ft². This is equivalent to a residence time of 5.13 seconds with a downcomer of constant size from top to bottom.

(a) To calculate the minimum downcomer area, use the following formula:

\[ \frac{\text{GPM}}{175} \left( \frac{24}{\text{TS}} \right) \left( \frac{1}{\text{SF}} \right) \text{ = Downcomer area, ft}^2 \]  

(eq.1)

SF is system factor if required, from page 6. TS is tray spacing in inches. Extrapolation for tray spacing greater than 30" is not recommended.

(b) When the value of \( d_{L} - d_{T} \) is less than 30 lbs./cu. ft., determine the design GPM/ft² from Chart B which compensates for the difficulties of settling froth as the density difference decreases.

\[ \frac{\text{GPM}}{\text{GPM/ft}^2, \text{from Cht. B}} \left( \frac{24}{\text{TS}} \right) \text{ = Downcomer area, ft}^2 \]  

(eq.2)

Use the larger value calculated from eq. (1) or (2) for the minimum downcomer area.

3. Charts D and D.1 are provided for rapid determination of segmented downcomer areas. Choose a chord that will provide at least the minimum downcomer area previously determined.

4. For a one-pass tray design the bubbling area is determined by the following formula:

\[ A_b = A_t \cdot A_{dt} \cdot A_{db} - A_e \]

\[ A_b = \text{bubbling area} \]

\[ A_t = \text{tower cross-sectional area} \]

\[ A_{dt} = \text{downcomer area at top} \]

\[ A_{db} = \text{downcomer area at bottom} \]

\[ A_e = \text{edge loss for 3' - 6" diameter and smaller}^* \]

\[ A_e = \frac{(\text{FPL})(\text{SRW})}{66} \]

Where: FPL = flow path length, inches

SRW = support ring width, inches

*Do not use the edge loss term for tower diameters greater than 3' - 6".

5. By using Charts E and E.1, determine the weir length corresponding to the chord height chosen in paragraph 3 above.
6. Calculated Tray Capacity - determine the percent of calculated tray capacity by using Chart C or the following formula:

\[
\text{Percent calculated tray capacity} = \frac{100}{(\text{TSF}) \ (\text{SF}) \ (0.51)} \left[ C_{\text{sf (net)}} + (0.001327) \left( \frac{\text{GPM}}{L_w} \right) \right]
\]

(eq.3)

\[
\text{TSF} = \text{tray space factor}
\]
\[
\text{SF} = \text{system factor}
\]
\[
C_{\text{sf (net)}} = \left( \frac{\text{actual CFS}}{A_b} \right) - \sqrt{\frac{d_v}{d_l - d_v}}
\]

\[
A_b = \text{bubbling area, sq. ft.}
\]
\[
L_w = \text{weir length, ft.}
\]

If \(\frac{C_{\text{sf (net)}}}{\text{GPM/L}_w} > 0.0102\)

\[
\text{Percent calculated tray capacity} = \frac{100 C_{\text{sf (net)}}}{(0.46) \ (\text{TSF}) \ (\text{SF})}
\]

7. Downcomer Capacity - check the percent downcomer capacity by using the following formula:

\[
\text{Percent downcomer capacity} = \left( \frac{\text{GPM}}{A_d} \right) \left( \frac{85}{175^2} \right) \left( \frac{1}{\text{SF}} \right) \left( \frac{24}{\text{TS}} \right)
\]

(eq.4)

*or Chart B value as discussed on page 8.

\[
\text{If Chart B value used, SF = 1.}
\]
\[
A_d = \text{downcomer area, ft}^2
\]
\[
\text{SF} = \text{system factor}
\]
\[
\text{TS} = \text{tray spacing, inches}
\]

8. Compare eq.3 and eq.4 calculated values. If the percent calculated tray capacity from eq.3 is less than 85%, the downcomer area should be increased and steps 3 - 7 repeated until the values for eq.3 and eq.4 are very close. This constitutes a balanced design. If the values for eq.3 and eq.4 are much lower than 85%, a smaller column diameter should be tried. Columns should be designed so that calculated tray capacity does not exceed 85%.
9. If sloped downcomers are used, the area at the bottom should not be less than 50% of the area at the top.

10. Set weir height. For pressure fractionators, the usual weir height is 3" at 24" and larger tray spacing, 2½" at 18" spacing, and 2" at 12" spacing. For vacuum fractionators, the usual weir height is 1" to 1½".

11. Set downcomer clearance. With the downcomer clearance set at ½" less than the weir height, check the pressure drop under the downcomer using Chart F. If the pressure drop exceeds 1.5 inches of hot liquid, the downcomer clearance should be increased. Ordinarily, the weir height is also raised to retain the ½" seal. However, where liquid rates will always be high, a zero seal is permissible. When the liquid rate is extremely low, a ¾" to 1" clearance is preferred.

D. Pressure Drop

1. Convert the vapor rate to CFM air equivalent

\[ \text{CFM (air equivalent)} = 60 \text{ ACFS} \sqrt{\frac{d}{v}} \]

2. Estimate the number of valves on the tray by multiplying the bubbling area by the approximate valves per-square-foot from the table below.

<table>
<thead>
<tr>
<th>TOWER DIAMETER</th>
<th>APPROXIMATE VALVES PER-SQUARE-FOOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'-6&quot; to 4'-0&quot;</td>
<td>10</td>
</tr>
<tr>
<td>4'-6&quot; to 7'-6&quot;</td>
<td>11.5</td>
</tr>
<tr>
<td>8'-0&quot; to 11'-6&quot;</td>
<td>12.5</td>
</tr>
<tr>
<td>12'-0&quot; and larger</td>
<td>13.5</td>
</tr>
</tbody>
</table>

3. Calculate CFM (air equivalent) per valve = CFM/No. valves.

4. Read dry tray pressure drop from Chart G using the appropriate curve for the type of valve chosen.

5. Read the effective depth of liquid from Charts H through L for the appropriate weir height.

6. Convert the effective liquid depth to inches of water pressure drop.

\[ \text{liquid pressure drop} = \text{effective liquid depth} \left( \frac{d}{62.4} \right) \]

7. Add the dry tray pressure drop to the liquid pressure drop to give total tray pressure drop in inches of water. Convert inches of water pressure drop to mmHg by multiplying by 1.865.
EXAMPLE PROBLEM NO. 1: HYDROCARBON FRACTIONATOR

GIVEN: Vapor Rate = 21150 lbs/hr.
Vapor Density = 1.7 lbs/lcu.ft.
Liquid Rate = 143855 lbs/hr.
Liquid Density = 42.7 lbs/lcu.ft.
Tray Spacing = 24"

DETERMINE: Safety Factor = 1.0 because non-foaming and $d_v < 1.8$ (pg. 6)

CALCULATE: Vapor ACFS = $\frac{211500}{* (3600) (1.7)} = 34.56$

Vapor Load = $34.56 \sqrt{\frac{1.7}{42.7 \cdot 1.7}} = 7.037$ (para. B.3)

GPM = $\frac{143855}{* (8.021) (42.7)} = 420$

From Cht. A, Trial Diameter 6'-0" I.D., S.F. (para B)

Min. DNC area = $\frac{420}{175} = 2.4$ sq. ft. (para C.2)

From Cht. D, 10" chord height = 2.4 sq. ft. (para C.3)
Bubbling area = $28.27 - 2(2.4)$
= 23.47 sq. ft.


% Tray Capacity = $\frac{100}{0.51} \left[ \frac{7.037}{23.47} + 0.001327 \left( \frac{420}{4.17} \right) \right] = 85\%$ (para C.6)

% DNC Capacity = $\left( \frac{420}{2.4} \right) \left( \frac{85}{175} \right) = 85\%$ (para C.7)

CFM (air) = $(60)(34.56)\sqrt{\frac{1.7}{0.0735}} = 9973$ (para D.1)

Estimated No. Valves = $23.47 (11.5) = 270$ (para D.2)

CFM (air) valve = $\frac{9973}{270} = 36.94$ (para D.3)

GPM/ft. of weir = $\frac{420}{4.17} = 100.72$

For 24" TS, use 3" weir height (para C.10)

Using Type A valves: (pg. 1)

Dry Pressure Drop, Cht. G = 2.25" water (para D.4)
Liq. Pressure Drop, Cht. L = 2.8 $\left( \frac{42.7}{62.4} \right) = 1.92$ (para D.8)
Total Pressure Drop/Tray = $2.25 + 1.92 = 4.17"$ water (para D.7)

$^*$conversion factor
DNC = Downcomer
EXAMPLE PROBLEM NO. 2: HYDROGEN FRACTIONATOR

GIVEN: Vapor Rate = 497079 lbs./hr.
       Vapor Density = 1.7 lbs./cu. ft.
       Liquid Rate = 513770 lbs./hr.
       Liquid Density = 42.7 lbs./cu. ft.
       Tray Spacing = 24"

DETERMINE: Safety Factor = 1.0 because non-foaming and d_v < 1.8  (pg. 6)

CALCULATE: Vapor ACFS = \( \frac{497079}{(3600)(1.7)} \) = 81.22

Vapor Load = 81.22\( \sqrt{\frac{1.7}{42.7 \cdot 1.7}} \) = 16.539  (para. B.3.)

GPM = \( \frac{513770}{(8.021)(42.7)} \) = 1500

From Cht. A, Trial Diameter 10'-0" I.D., D.F.  (para B.)

Min. DNC area = \( \frac{1500}{175} \) = 8.57 sq. ft.  (para C.2.)

From Cht. D, 12.5" chord height = 4.35 sq. ft.  (para C.3)

Total side DNC area = 2(4.35) = 8.7 sq. ft.

Select center DNC width - 10.5"

Center DNC area = \( \frac{10.5}{12} \) (10.0) = 8.75 sq. ft.

Bubbling area = Tower Area - Total side DNC area
                - Center DNC area at bottom
                = 78.54 - 8.7 - 8.75
                = 61.09

From Cht. E, Side DNC weir length = 6.1 ft.

L_W = 2(6.1) = 12.2 ft.

% Tray Capacity = \( \frac{100}{0.51} \left[ \frac{16.539}{61.09} + 0.001327 \left( \frac{1500}{12.2} \right) \right] \) = 85%  (para C.6.)

% DNC Capacity = \( \left( \frac{1500}{8.7} \right) \left( \frac{85}{175} \right) \) = 84%  (para C.7.)

CFM (air) = (60)(81.22)\( \sqrt{\frac{1.7}{0.0735}} \) = 23437  (para D.1.1)

Estimated No. Valves = 61.09 (12.5) = 764  (para D.2.)

CFM (air) \text{ valve} \ = \frac{23437}{764} = 30.68  (para D.3.)

For 24" TS, use 3" weir height

Using Type A valves:

Dry Pressure Drop, Cht. G = 2.8" water  (para D.4.)

Liq. Pressure Drop, Cht. L = 2.6 \( \frac{42.7}{62.4} \) = 1.78  (para D.6.)

Total Pressure Drop/Tray = 2.8 + 1.78 = 4.58" water
                        = 8.54 mmHg  (para D.7.)

*conversion factor

DNC = Downcomer