

Design of Process Equipment

Column devices

Lecture

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Column devices

Column devices / Distillation
Rectification, adsorption,
absorption, quenching,
extraction / are one of the
most frequently used types of
separation devices in industry.

They are devices that serve to
separate one or more
components from a gas or
liquid mixture.

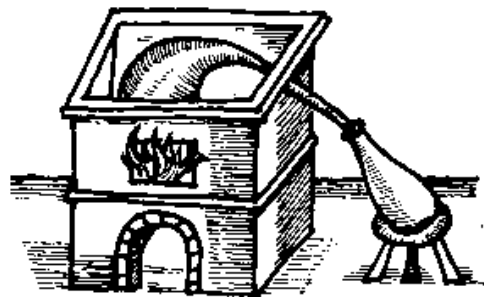


Illustration of Distillery Workers, c. 1580-1605. In the foreground, two men are consulting with a book. Others carry out the distillation process. The Invention of Distillation is the seventh record in a print series called *Nova Reperta* (New Inventions of Modern Times).

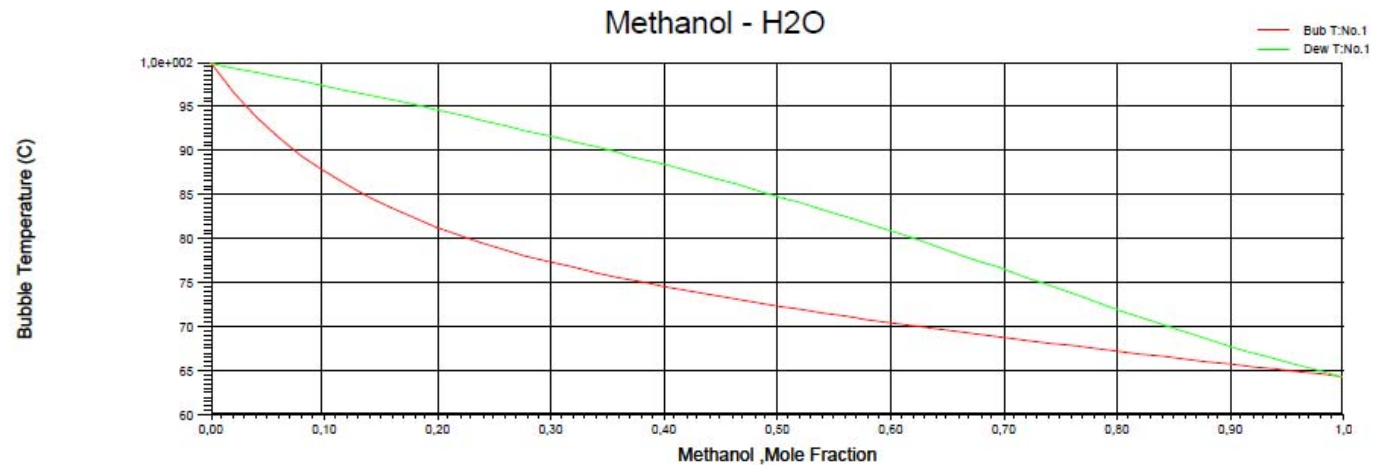
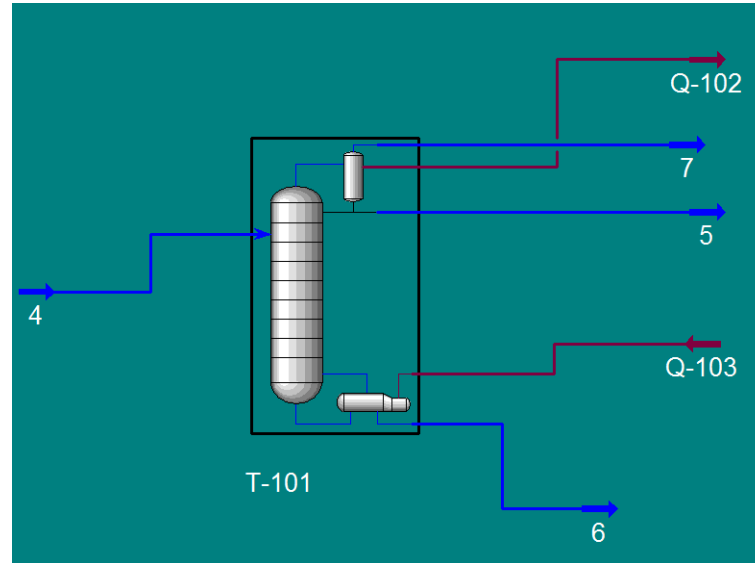
Process design

It is complex.
 Knowledge of all

HEAT TRANSFER
 MASS TRANSFER

Today, preferably on
 a PC with simulation
 programs such as
 ASPEN.

5th year of
 Honeywell UNISIM



Column devices

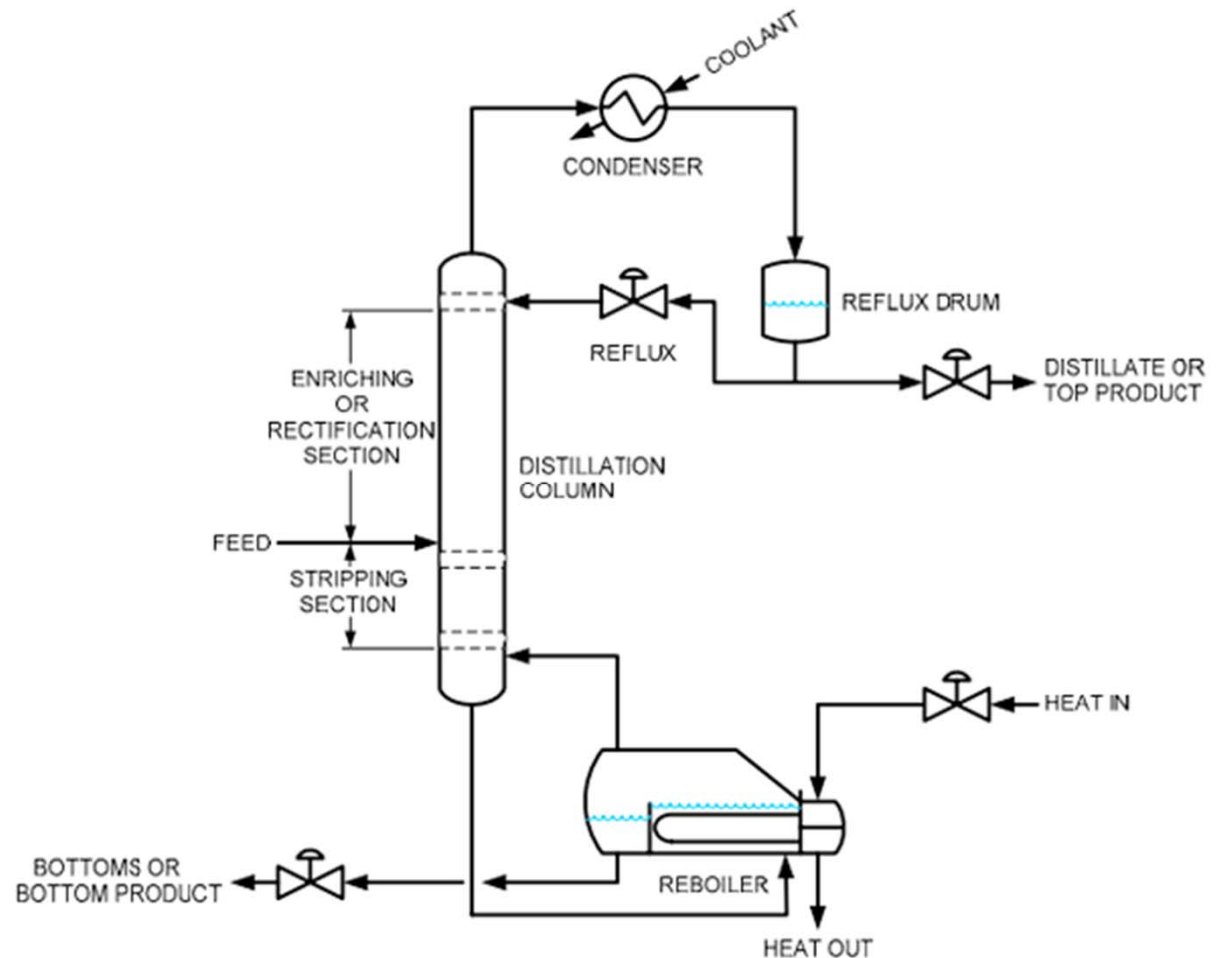
General information

Division according design

- Trayed : /Bubble cup tray, Sieve, Valve, etc ../
• Packed Bed

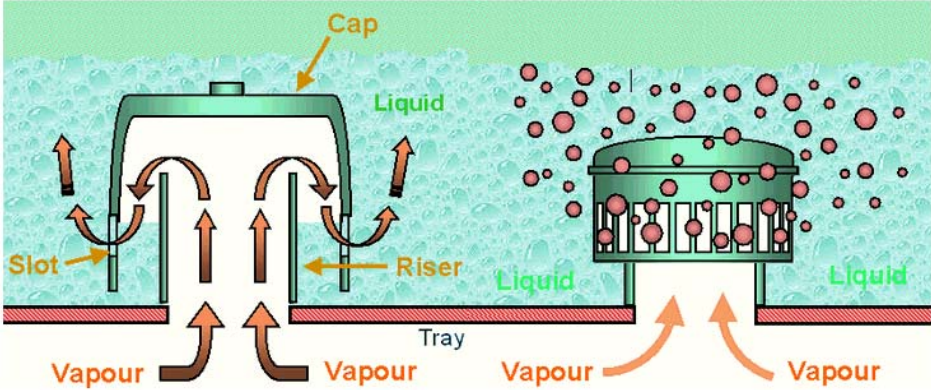
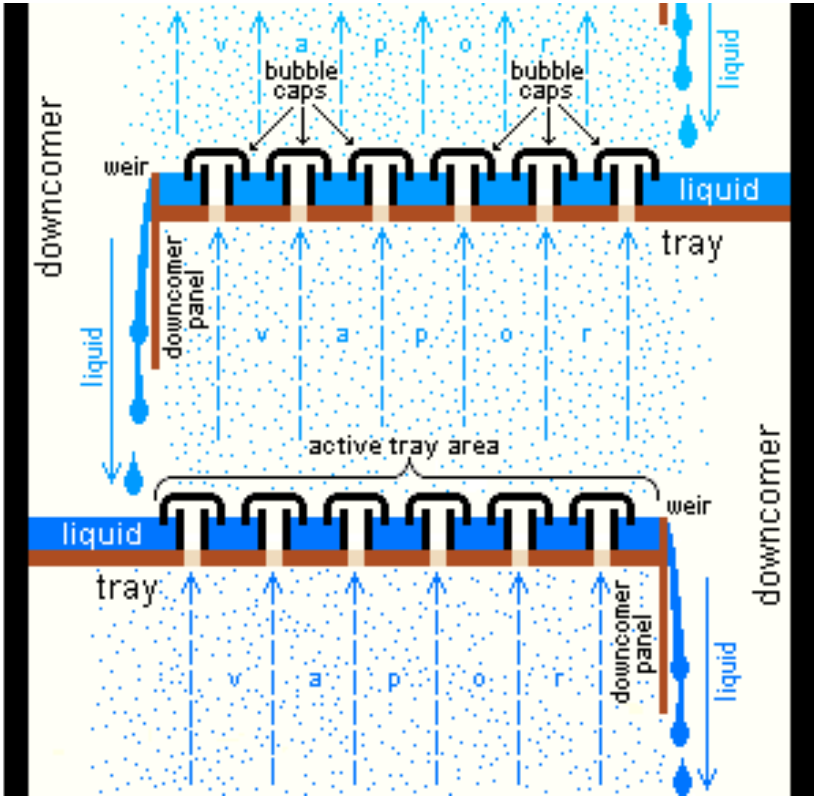
Column

It is a mass exchanger, usually cylindrical in shape with an internal structure that ensures the transfer of mass during the countercurrent movement of the phases.



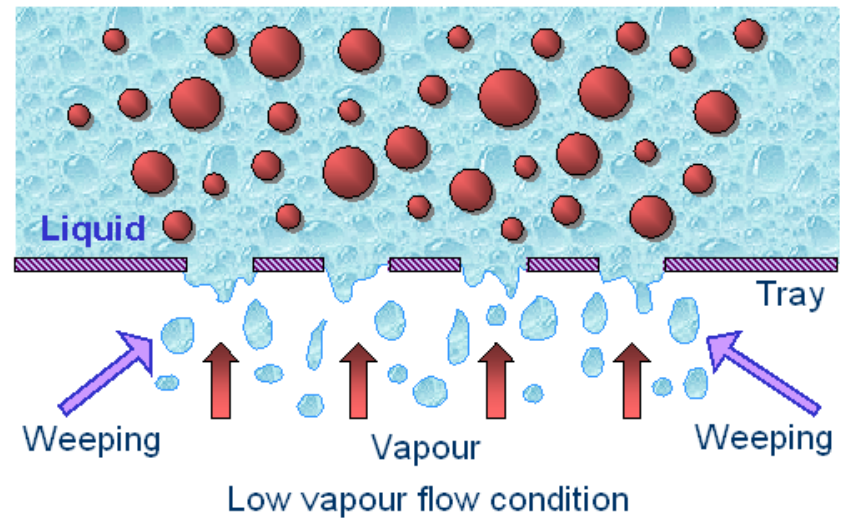
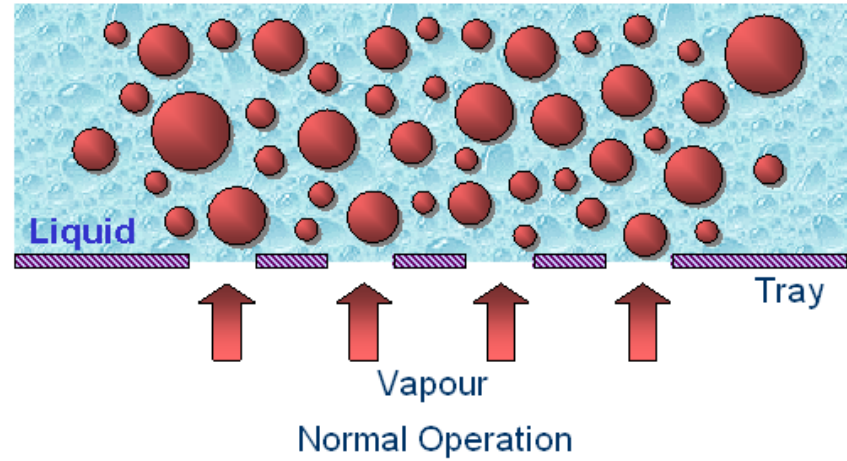
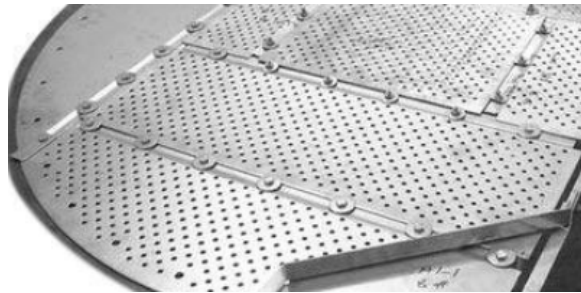
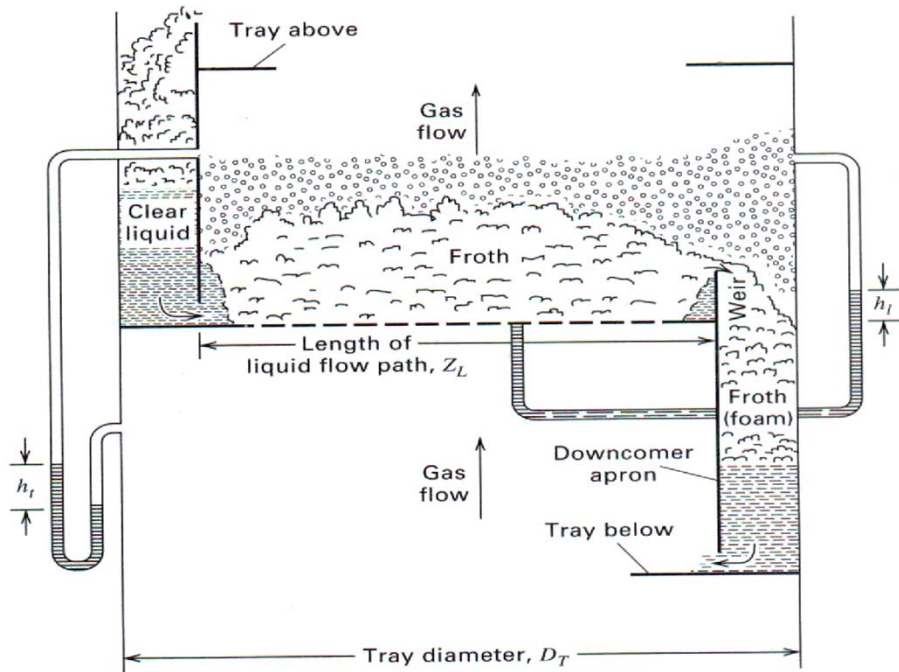
Trayed column

Bubble cap trays



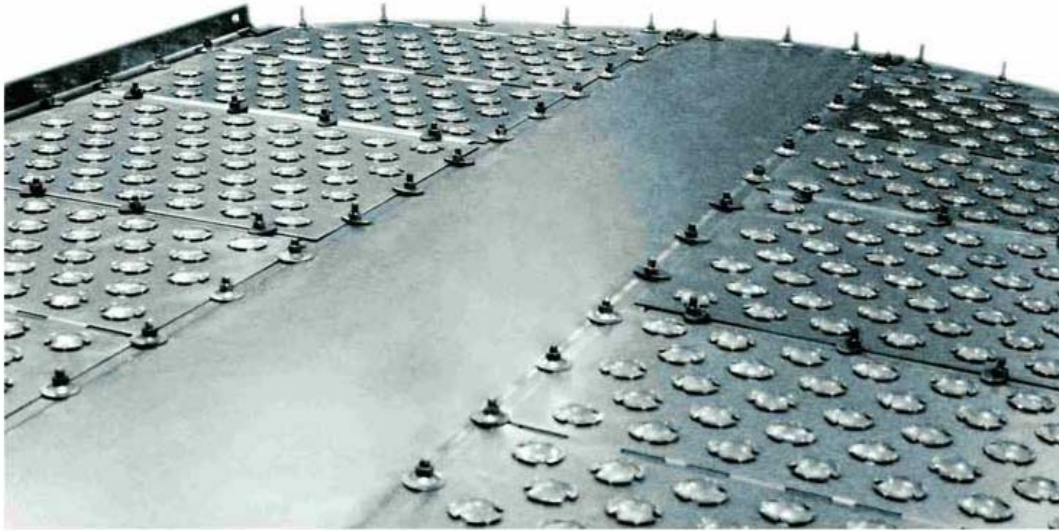
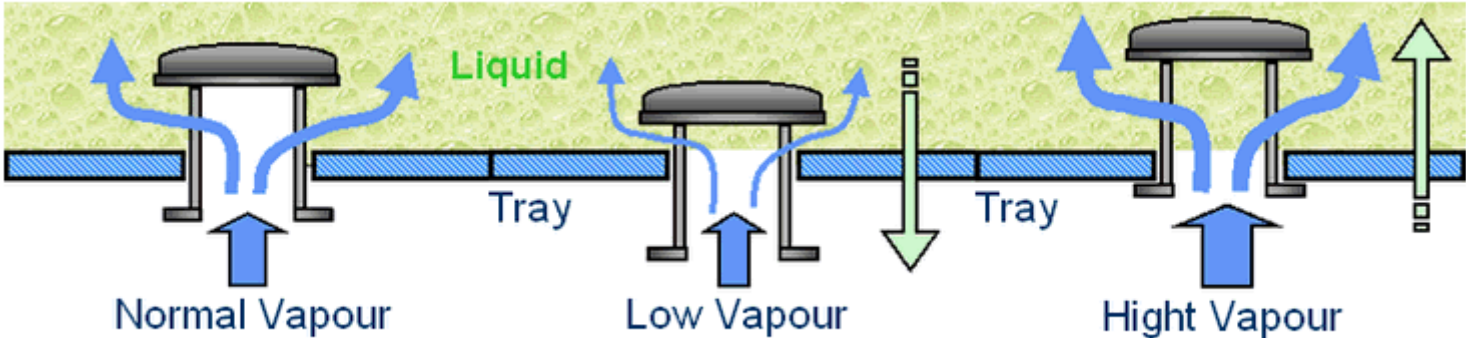
Trayed column

Sieve Trays

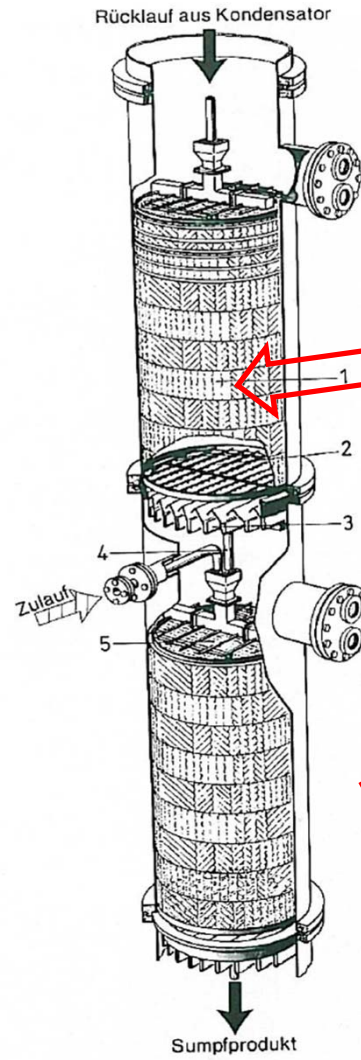
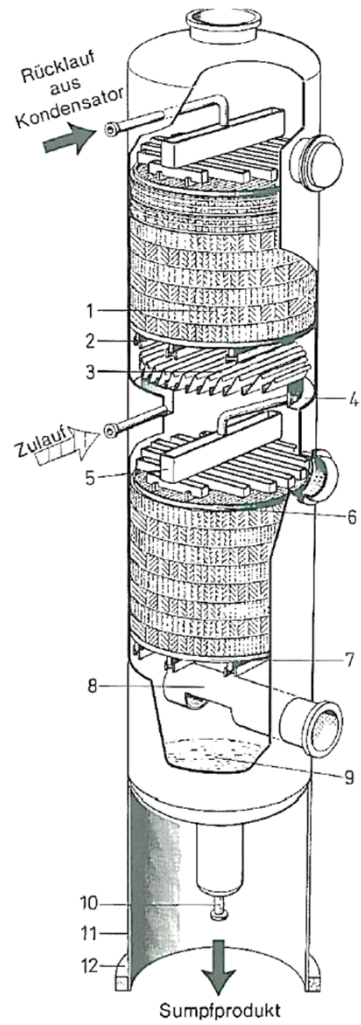


Trayed column

Valve trays



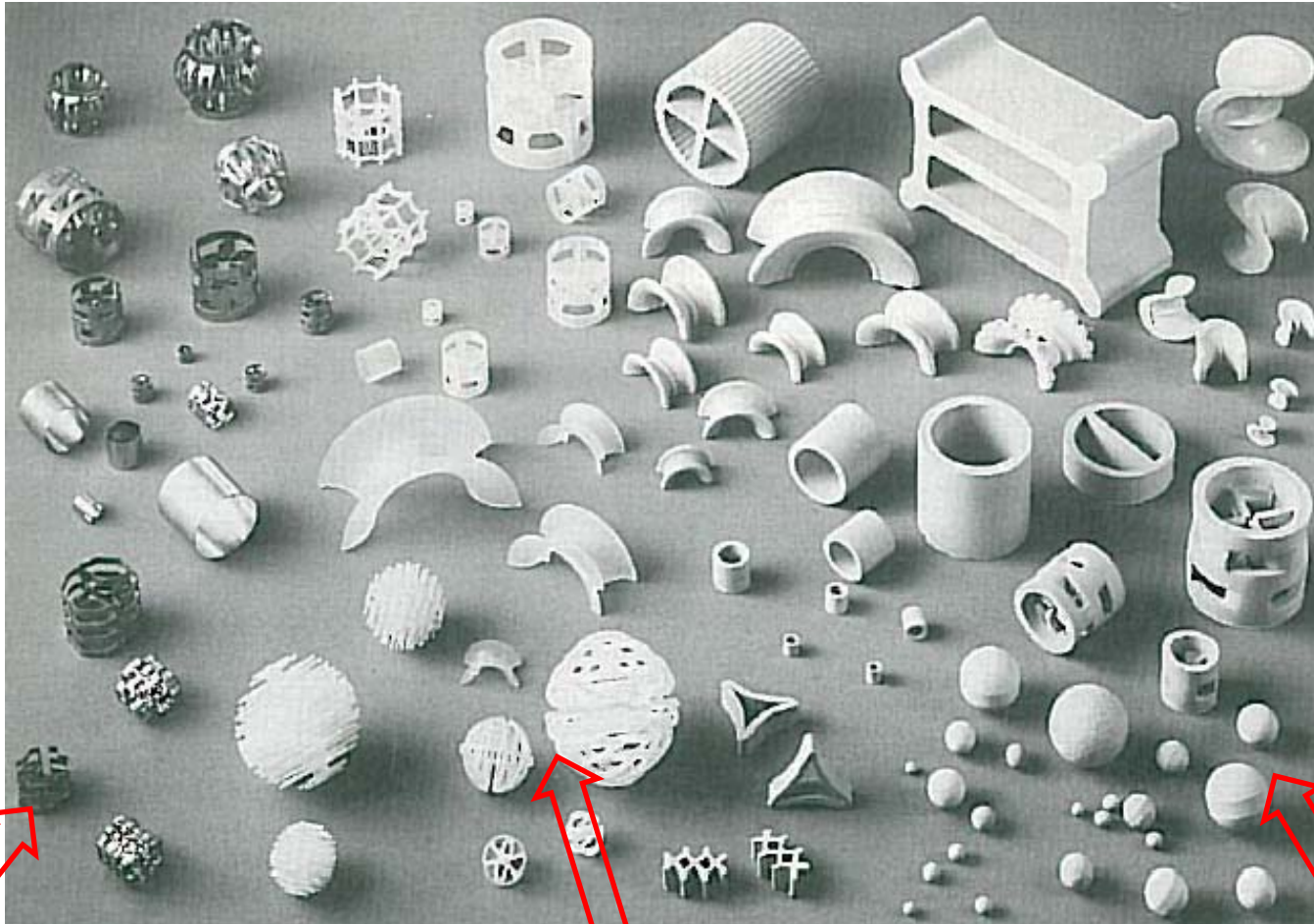
Packed bed column



Packed bed column



Packed bed column

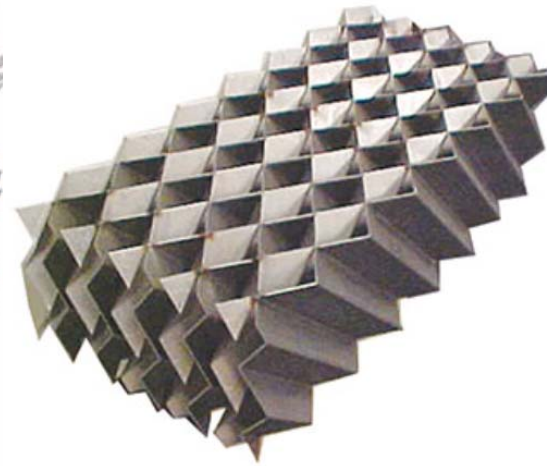
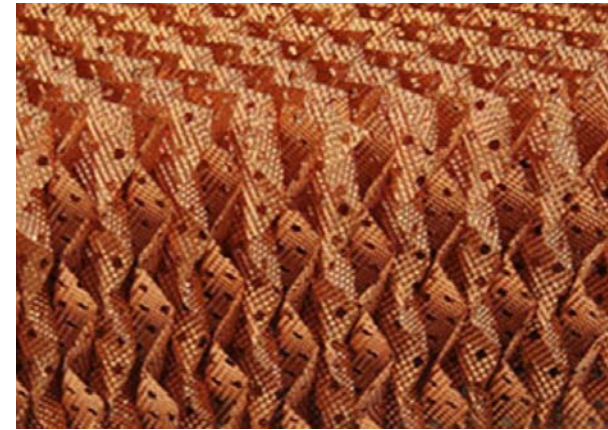
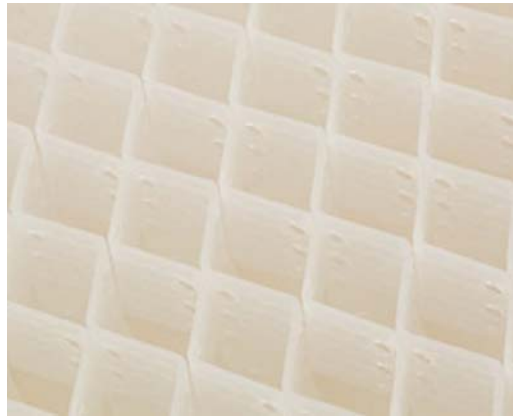
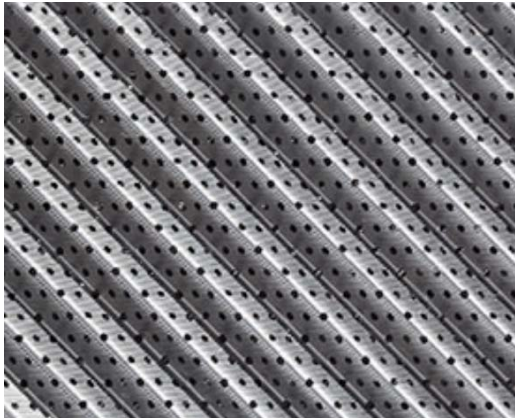


Oceľ

Plast

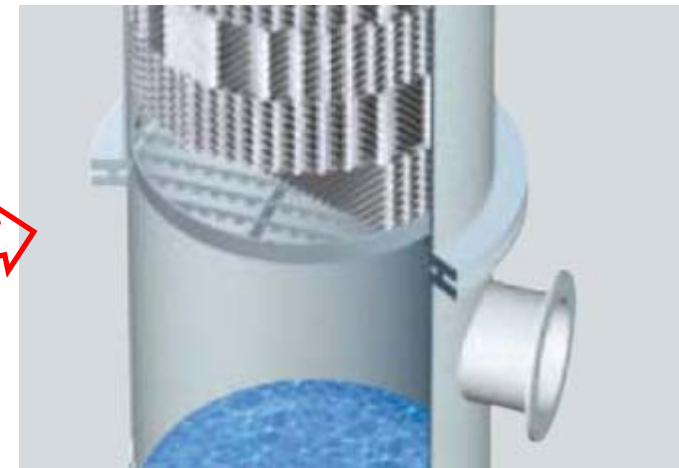
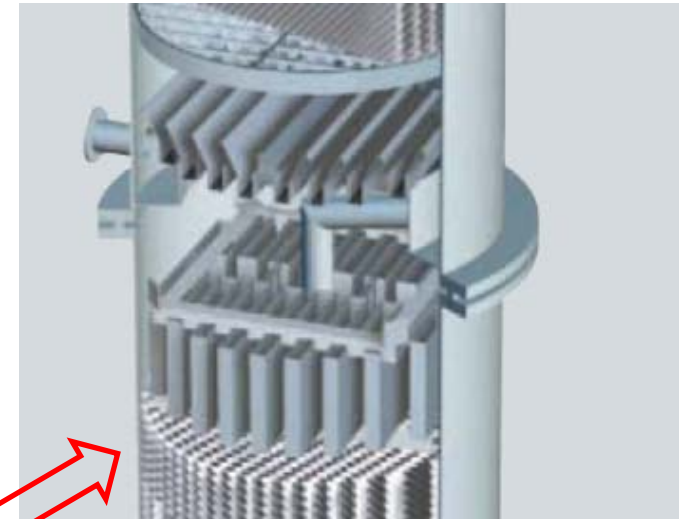
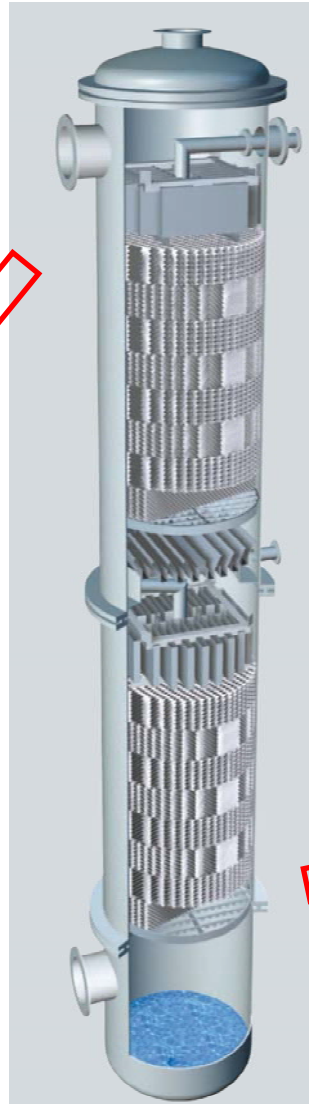
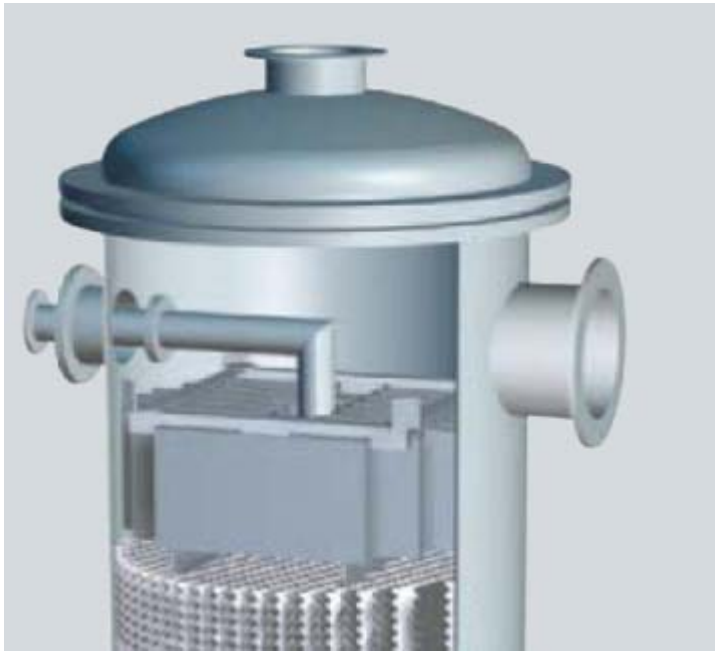
Keramika

Packed bed column



Packed bed column - Flange

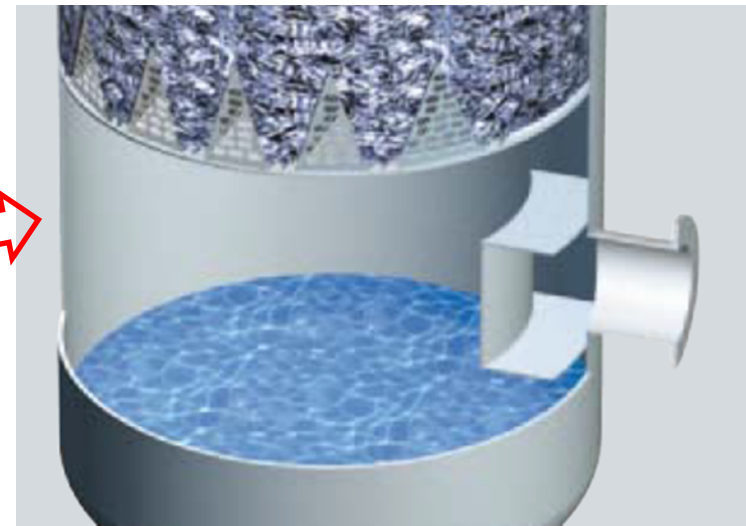
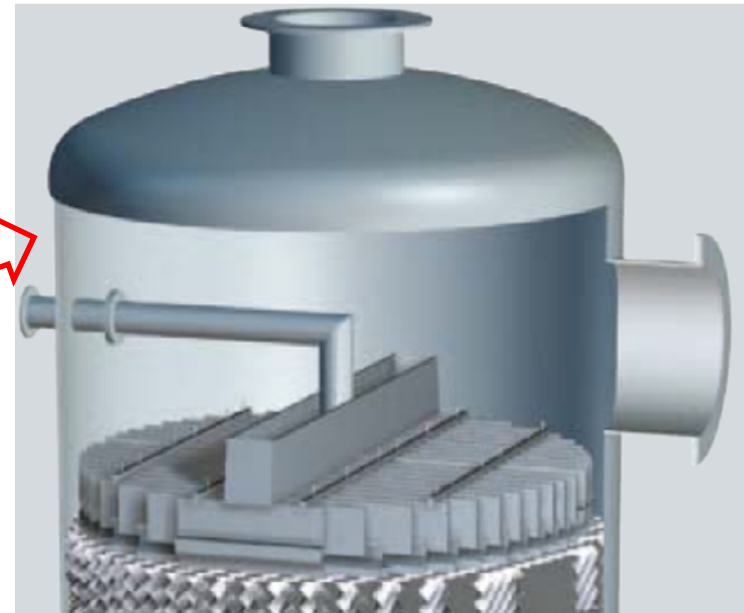
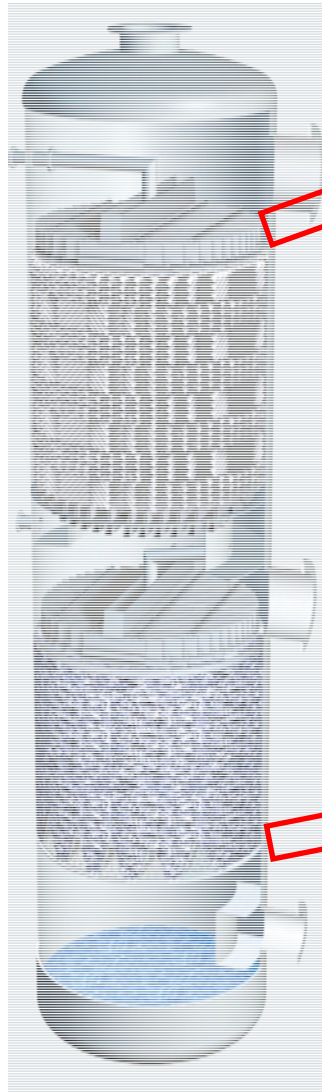
For small dimensions /
approx. 900 mm/, the
column is manufactured
as a flanged column for
assembly



Packed bed column – no flange

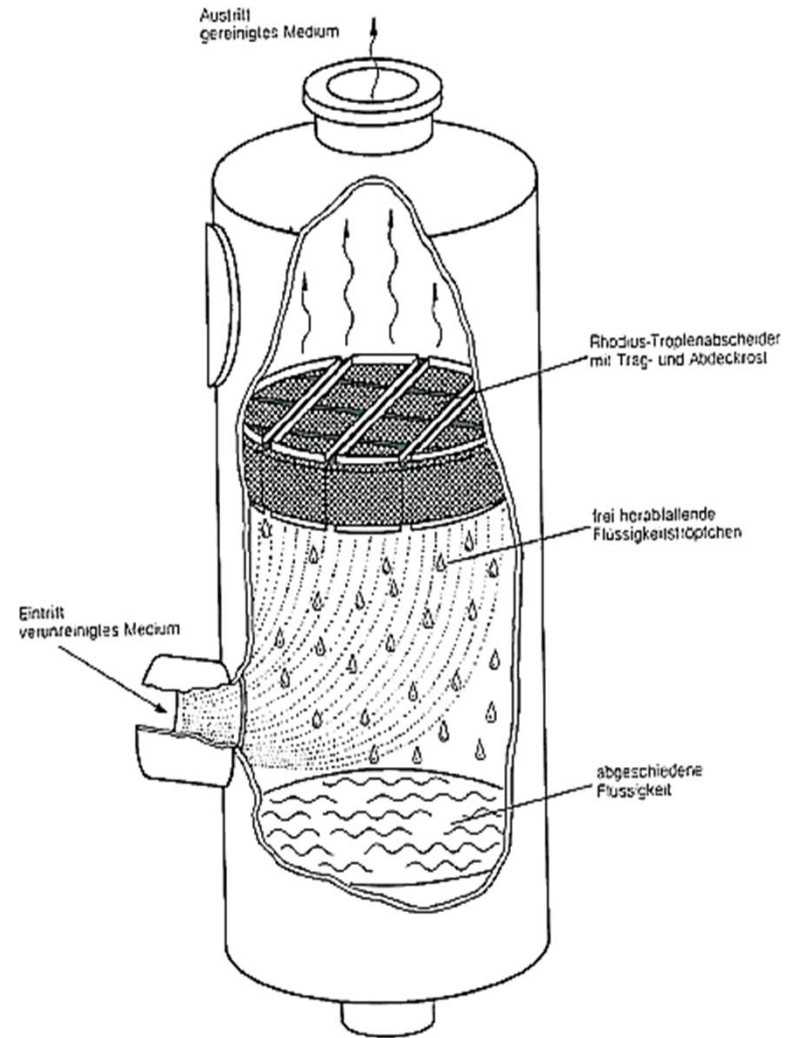
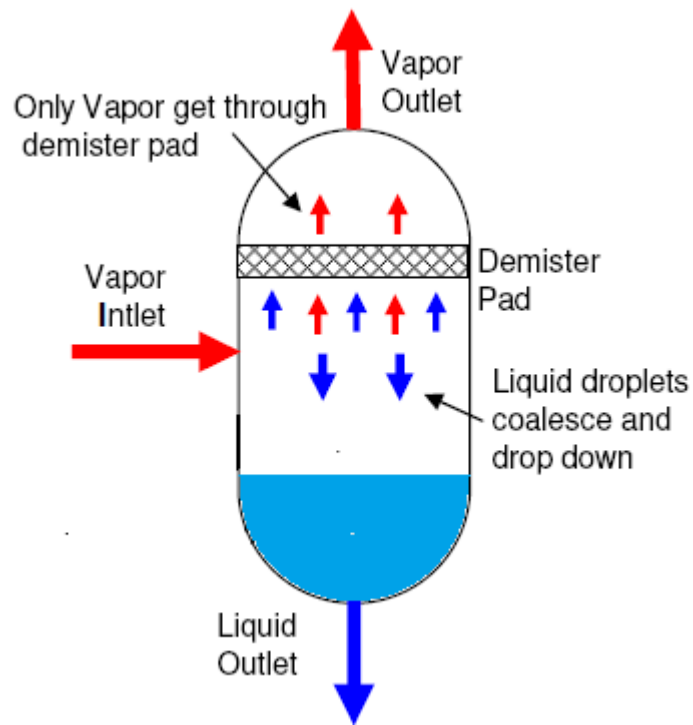
For larger diameters / over 900 mm/, the column is manufactured as fully welded.

For the assembly of individual sections and parts, it is necessary to equip the device with manholes /MANHOLE/ min. DN600



Demister /Mist eliminator/

It is part of a column
Alternatively, it is a separate device,
included in the technology



Demister /Mist eliminator/

Droplet formation

Benefits: Reduction of valuable losses
Chemicals

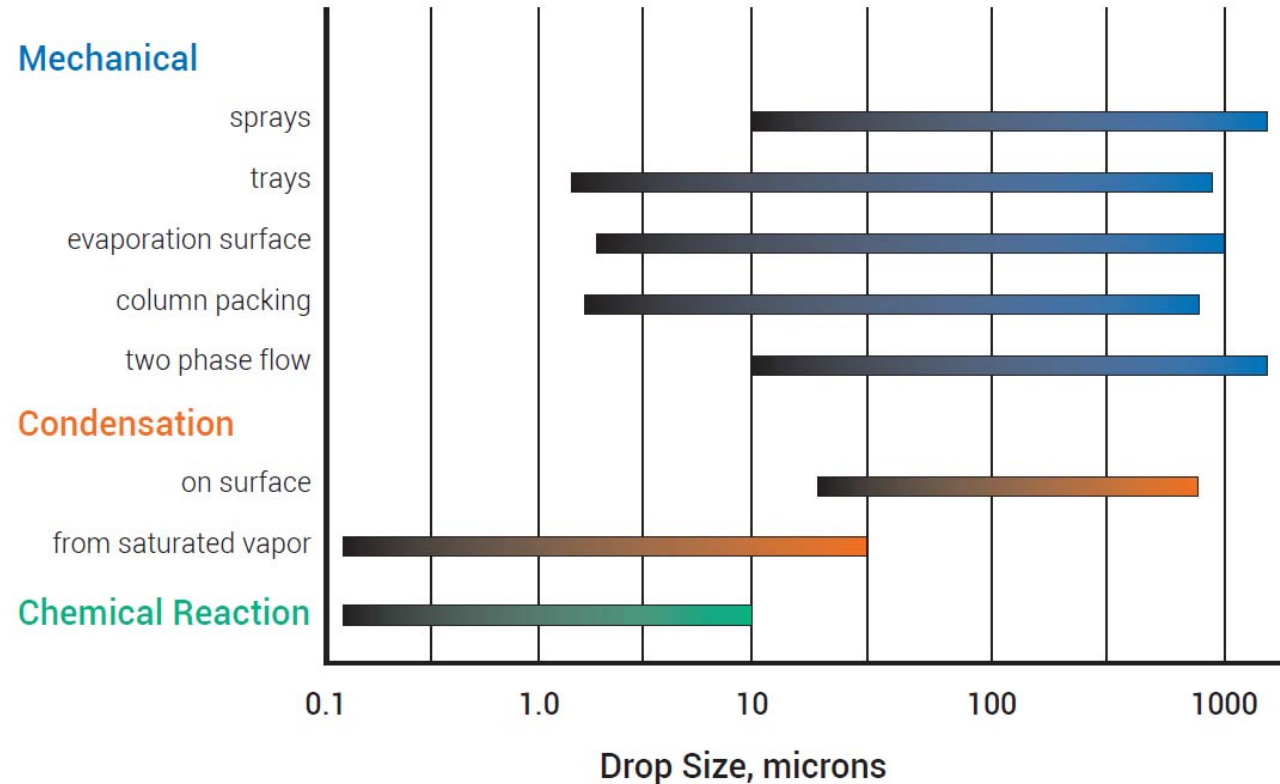
Capacity increase

Increase in product purity

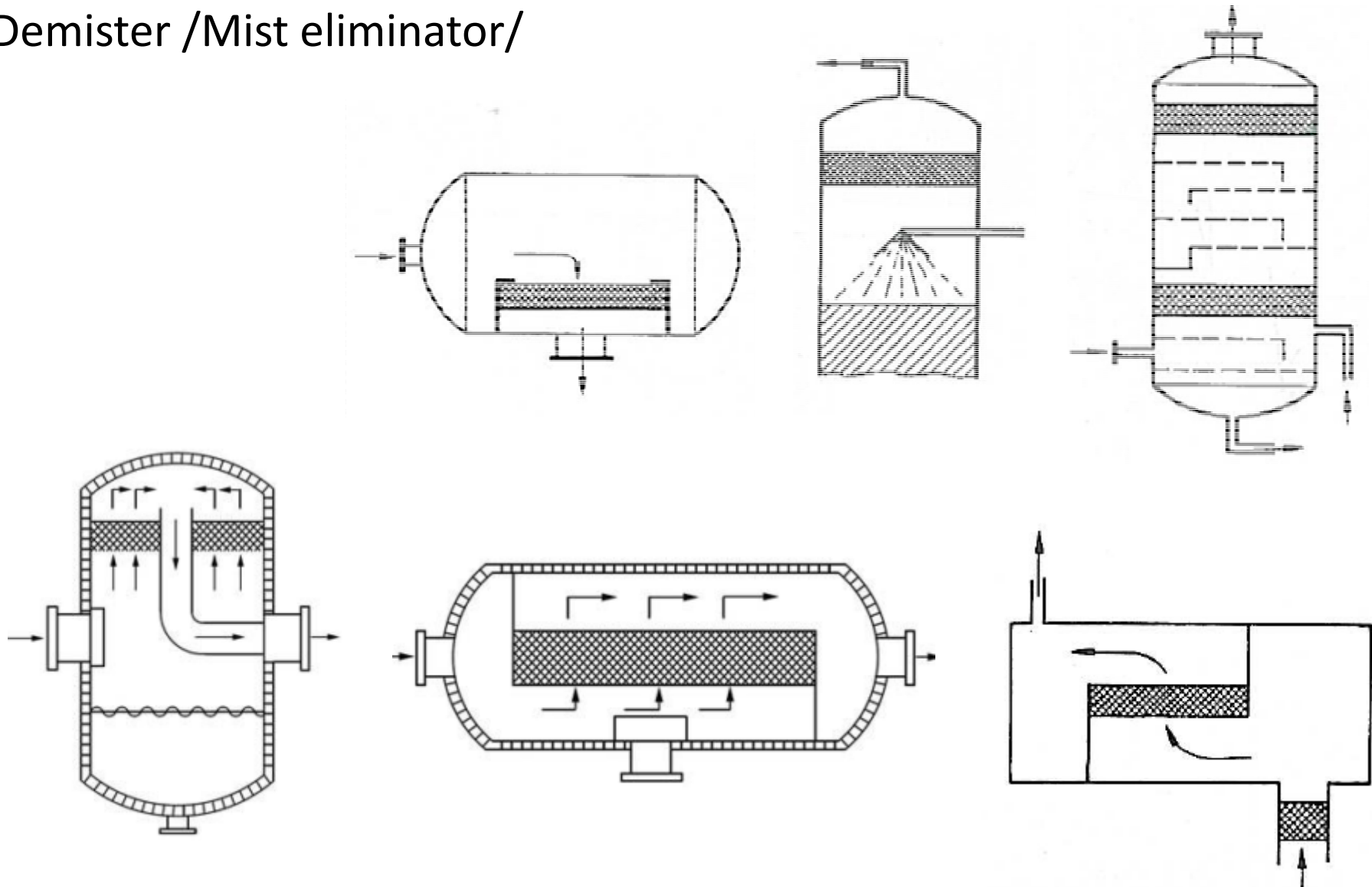
Reduction of contamination

Equipment protection

Reduction of environmental pollution



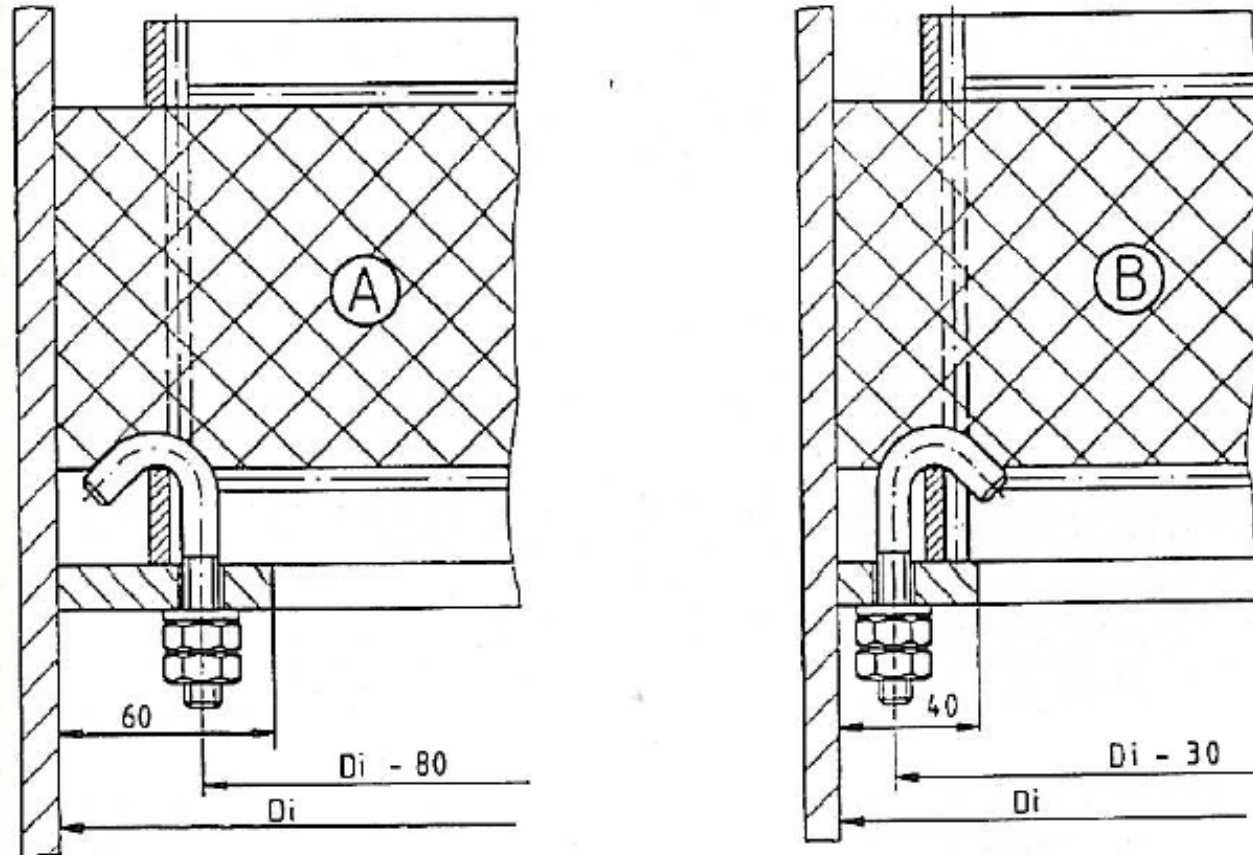
Demister /Mist eliminator/



Demister /Mist eliminator/

Fixing
and
installation

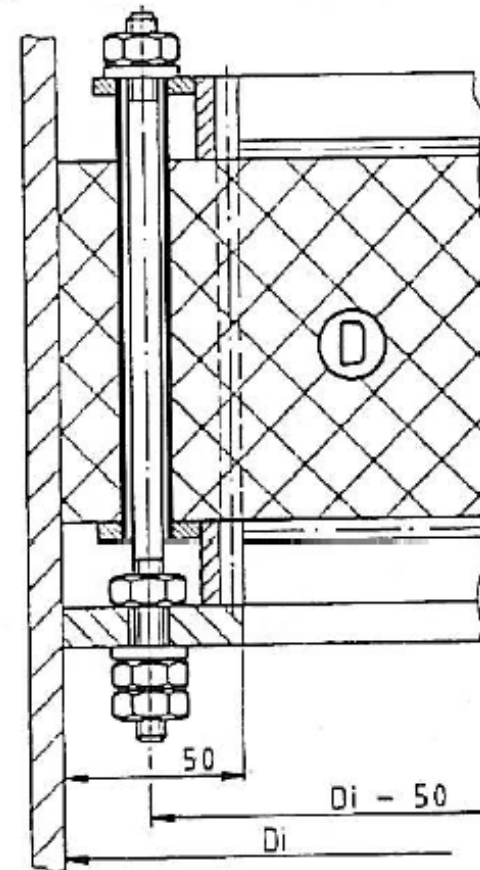
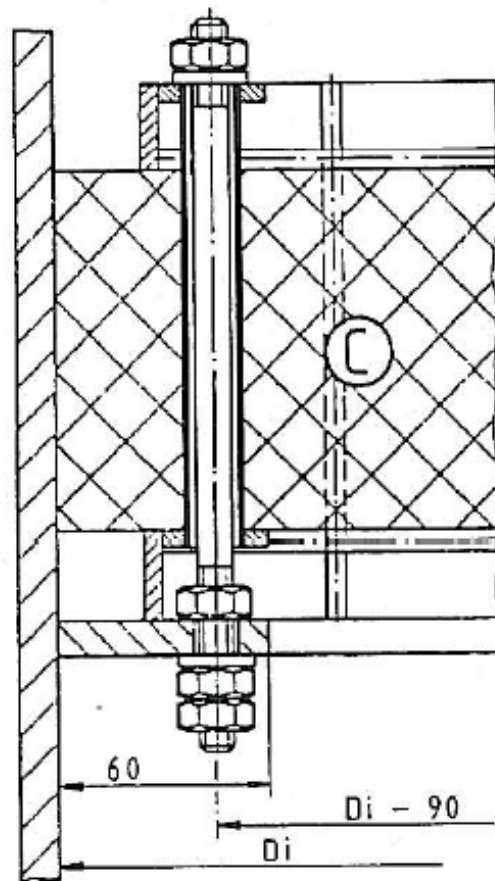
Einbau und Befestigung von unten



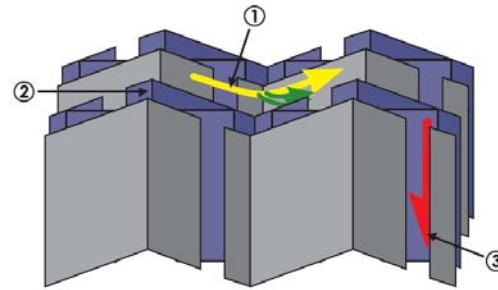
Demister /Mist eliminator/

Fixing
and
installation

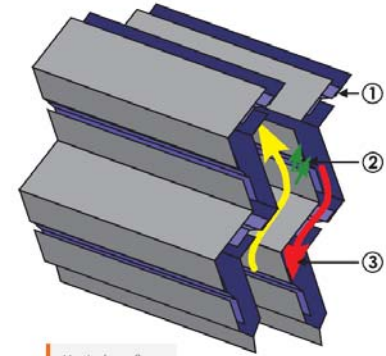
Einbau und Befestigung von oben



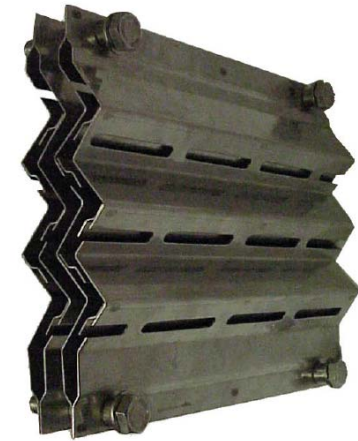
Demister /Mist eliminator/



Horizontal gas flow.



Vertical gas flow.

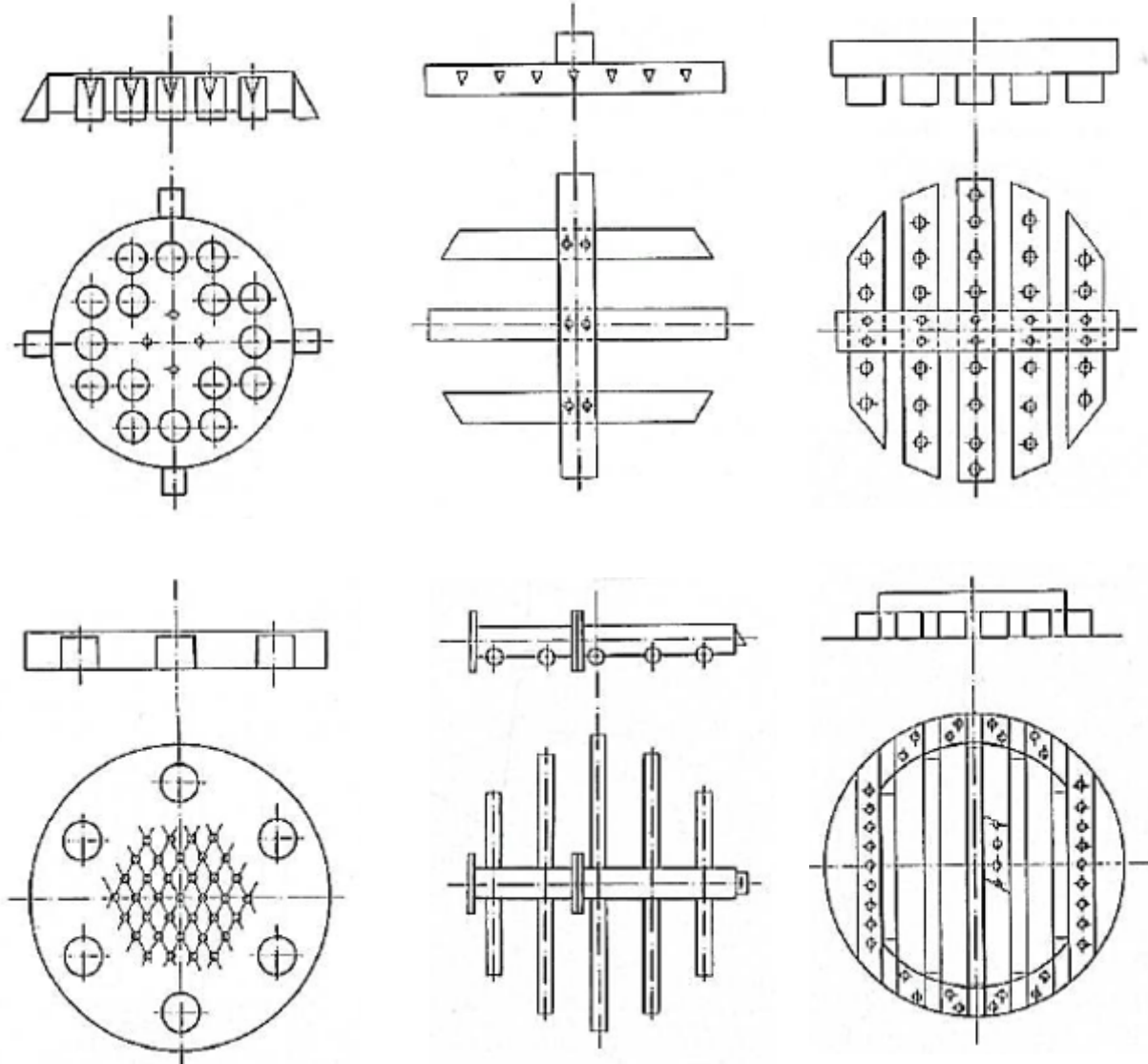


Liquid distributor

It ensures the best possible distribution and re-distribution of the inlet liquids

Gravity

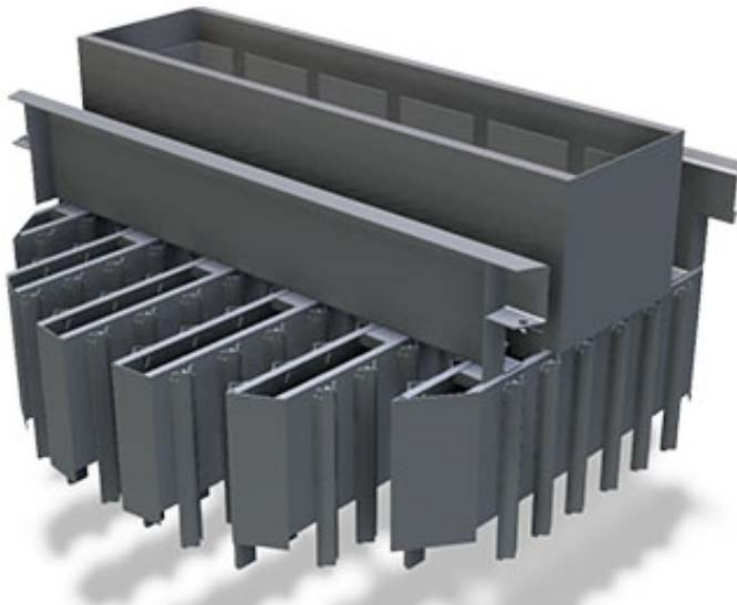
Spray Nozzle



Liquid distributor

It ensures the best possible distribution and re-distribution of the inlet liquids

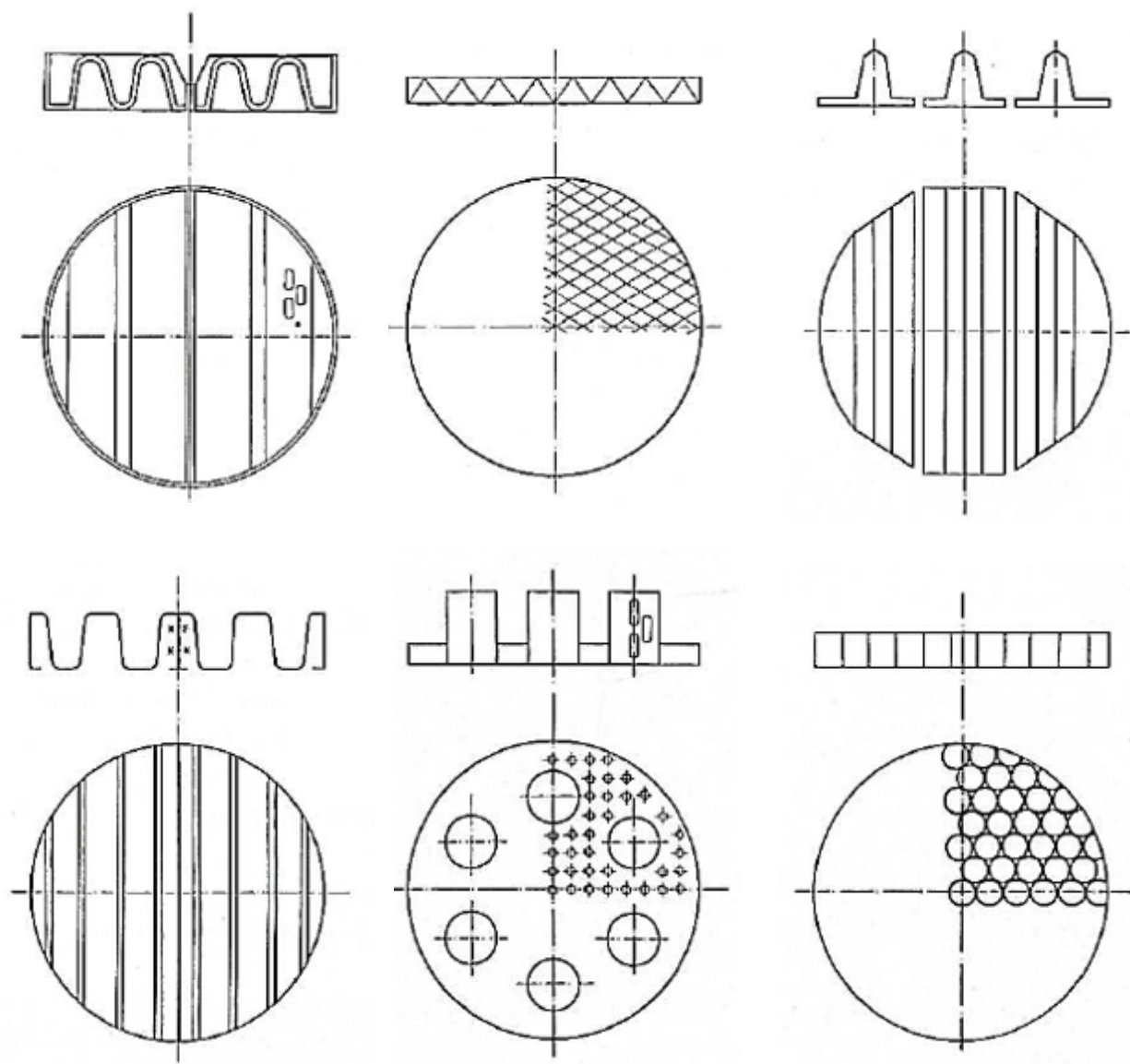
Gravity
Spray Nozzle



Support plate

For Packed bed column
column devices

Different types



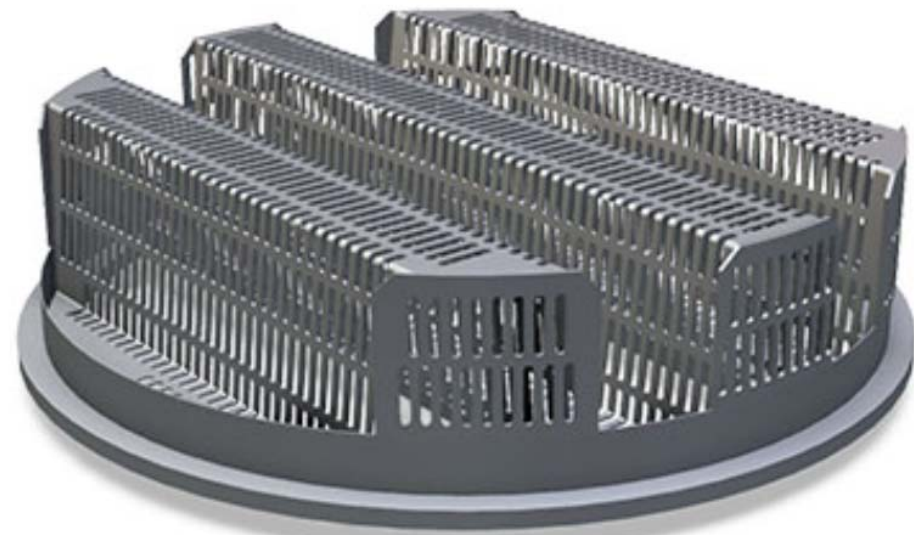
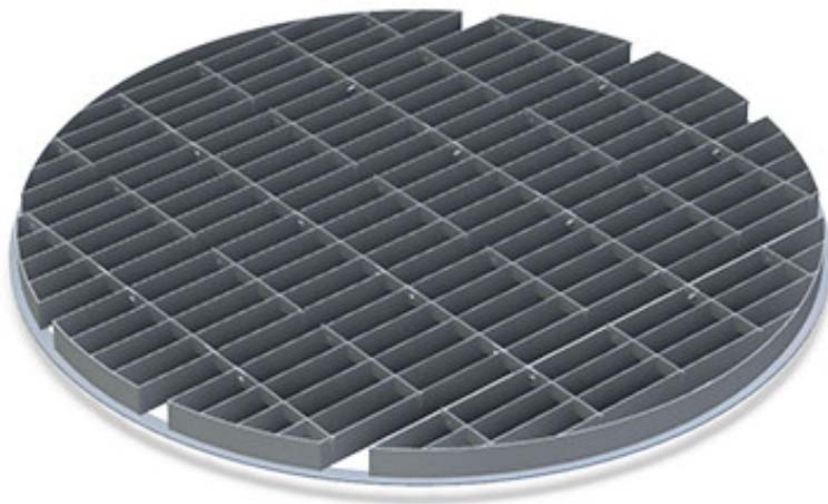
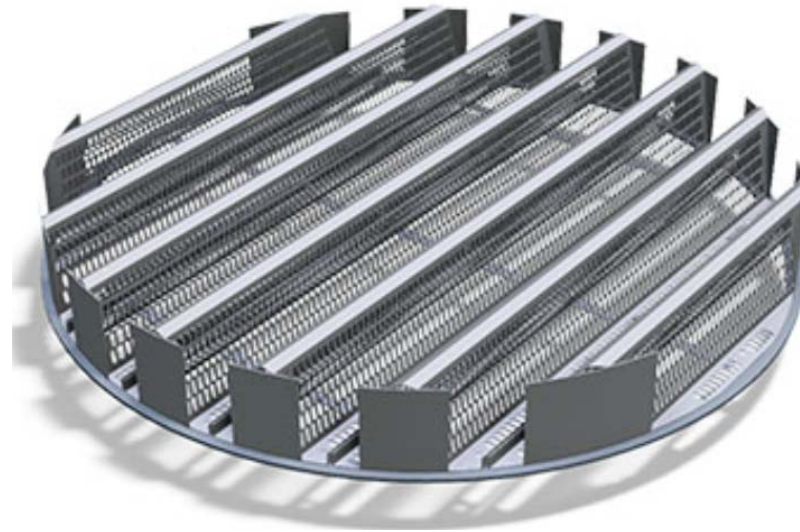
Support plate

Fixing method

Welded

Demountable

Maximum load capacity



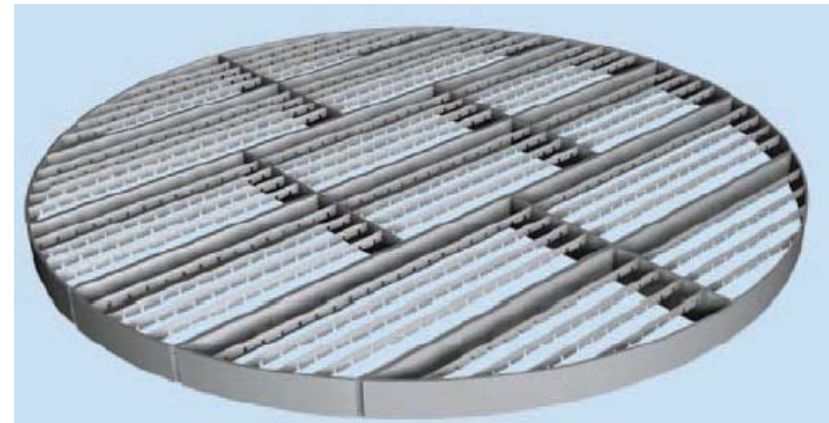
Support plate

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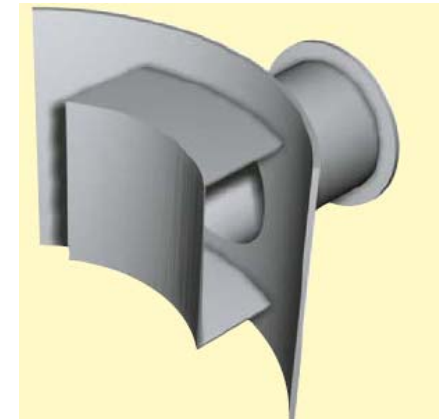
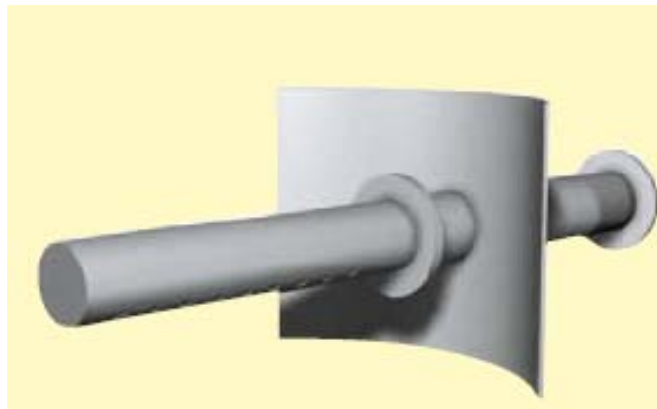
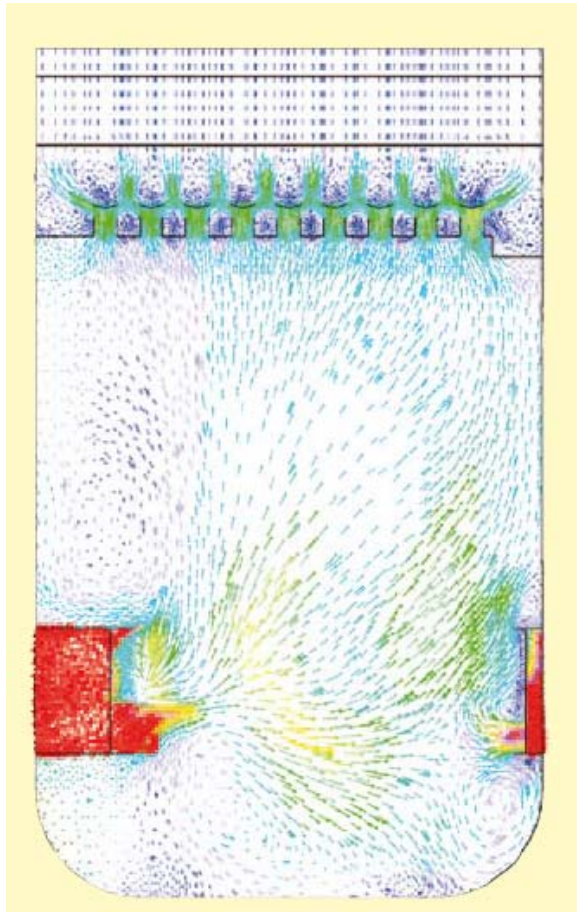
Demountable

Maximum load capacity



Inlet pipeline

Gas



Inlet pipe

Liquid

