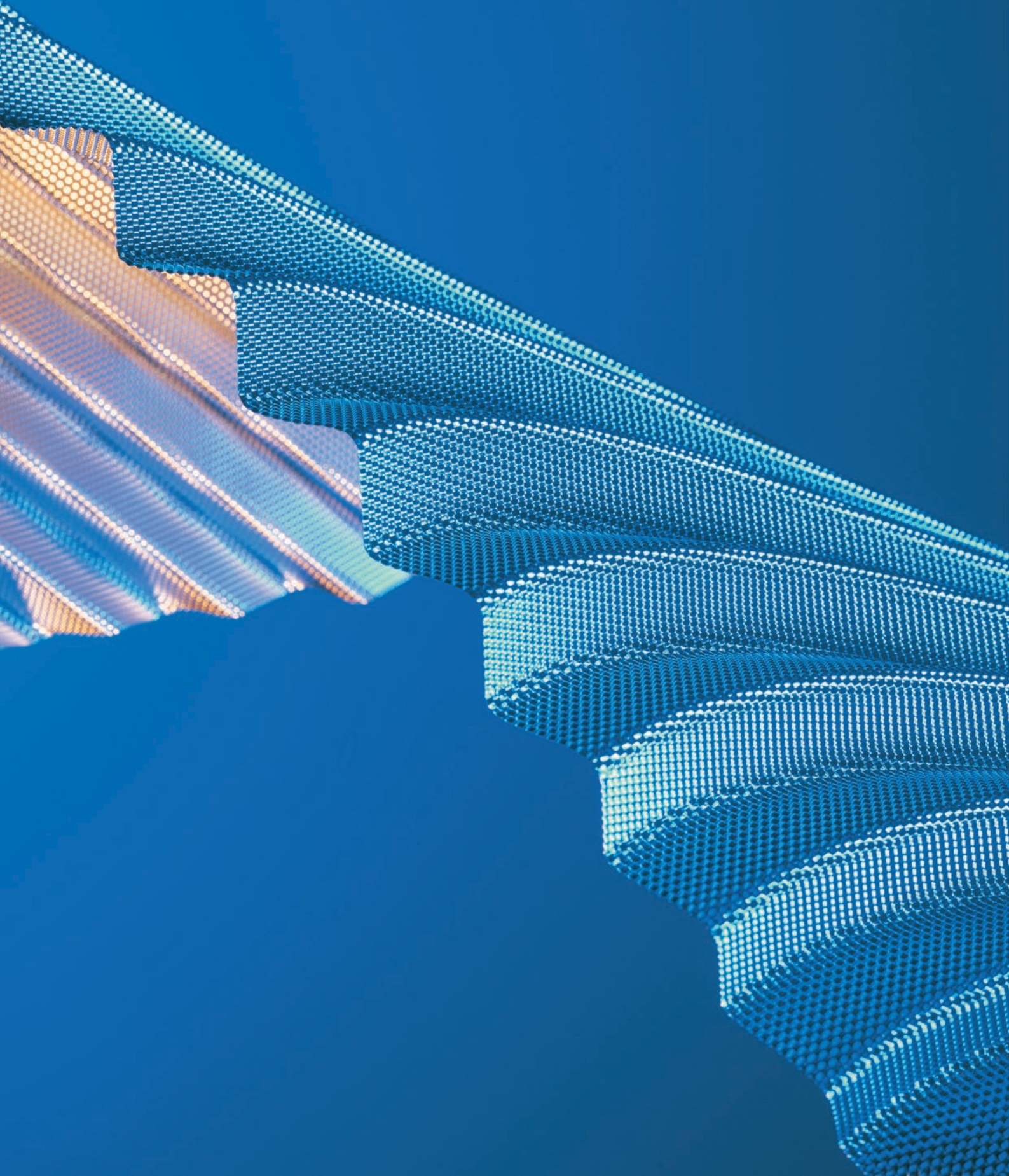







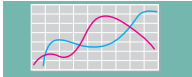






















# MONTZ

Your partner in chemical engineering



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# The Julius Montz Company

**An innovative enterprise with a long tradition**

**Today's very modern industrial enterprise with its head office in Hilden and engineering office in Landau and Weinheim together with agencies and licensees world-wide has grown from a small copper-smith's shop at the beginning of this century.**

▼  
Entrance to the  
Montz Building





*Dear business friends,*

*where ever distillation technology for thermal separation in the chemical and pharmaceutical industry, up- and downstream oil industry und in renewable energies is needed, Montz is known for its long-term based experience and the high technical reputation.*

*Montz offers a complete portfolio of distillation columns and column internals, including state-of-the-art technology inventions like dividing wall columns and the sandwich-packing. In addition we offer the engineering for complete manufacturing units in the field of potable and*

*power alcohol technology, solvent recovery and air scrubbing plants.*

*With our competence, experience and products engineered to the detail we help you during basic and detail engineering, procurement of components, installation on site until the plant is in continuous operation.*

*Internals like mass transfer trays, structured packings and liquid distributors need a highly sophisticated design into the details. We develop designs and solutions solely adapted to your specific needs. Your pilot- and miniplant tests can be supported by our tried-and trusted column setups.*

*We are delighted that we can offer you the service and know-how of Montz world-wide. This catalogue shall give an overview of our product portfolio.*

*Kind regards,*



G. Frey

C. Frenken



◀  
Atrium and fountain in the Montz Building.



# The Julius Montz Company

An innovative enterprise with a long tradition



**Trend-setting research and continuous improvements to the existing range of services offered is what has distinguished the Julius Montz Company over decades as a creative and innovative enterprise.**

**Today, the company is regarded as one of the leading specialists in the field of thermal fractionation technology offering a wide range of services and products.**

In 1911, when Julius Montz Company was founded in Hilden as a copper forge, nobody could foresee what the future would bring. But the emphasis of our development was already clear: the chemical industry along the river Rhine and Wupper as well as the coking plants in the Ruhr area were already among our most important customers. Apparatus and vessels were manufactured for them. Over the years, the cooperation with the chemical industry became closer and more intense.



In the fifties this led to a greater specialisation in distillation technology. Julius Montz GmbH became an expert and innovative specialist in this field through its own developments and patents.

In order to boost the economic competitiveness, the firm of Julius Montz GmbH affiliated with the firm of F.A. Neuman, Eschweiler in 1971 as a wholly owned subsidiary. Constant further developments and improvements to the existing technologies and apparatus led to an increasingly better and wider range of products. This included the development of special equipment and technology for distillation which form the basis of today's production program such as Tunnel Trays Type Streuber, Thormann® Trays, crossflow trays Type KSG, spring column internals – which are known to be one of the first structured packed internals available - and structured packings as well as columns and apparatus made of high-quality materials such as Hastelloy, titanium, and stainless steels. These efficient Montz products really caused a stir on the world markets. The resulting growth in export business then led

to corporations with international partners and the licensing of Montz products in Brazil, Japan and the USA.

In the eighties the range of products was further extended by a new and important field: dividing wall column technology. Montz was the first to use this new technology inside production columns and has developed it since into an important business field for the Julius Montz GmbH. Through patented own developments and detail solutions, this column technology was developed into a standard tool for distillation technology in close cooperation with BASF AG, leading into a cooperation agreement for the global marketing in the year 2000.

With the arrival of the latest computer systems and corresponding software Julius Montz GmbH expanded its capacity in the field of engineering services for process and plant engineering. One can thus expect not only outstanding products from Montz but also professional and versatile engineering services. At the end of the nineties, Montz Process Engineering was further extended to include alcohol technology and

solvent recovery through the establishment of a new branch in Landau. Turnkey plants are now being successfully delivered to international customers. Further developments to the Thormann® trays for minimum liquid loads allow column diameters of 9 meters and more.

Reorganisation measures in 2001 led to the foundation of the F. A. Neuman holding company, into which Julius Montz GmbH was incorporated.

In the year 2008 Montz expanded again, this time into the field of refinery techniques. With the now established buro in Weinheim the range of distillation trays, liquid distributors and mist eliminators has been completed successfully.

Today Julius Montz GmbH has a leading position in its sector. It can offer a comprehensive and efficient range of products and services, is involved in research intensive product development with universities national and abroad and is a competent and innovative partner for you as a customer thanks to its creative and individual products and services.



# Engineering Services

Competent service in the field of plant engineering

**Apart from excellent product developments, the Julius Montz Company can also offer complete engineering services for distillation plants, thus ensuring an exact planning and a comprehensive and professional execution. Following now are applications of Montz engineering products.**

## Fields of application:

### Oil and gas industry

- Liquid-liquid extraction to remove methanol from fuel additives
- Columns to dry natural gas
- Atmospheric and vacuum columns to fractionate crude oils

### Absorption and solvent recycling

- Exhaust air treatment in aluminium rolling mills
- Absorption of organic components in offgas and air streams

### Air separation

Structured packings and distributing systems for columns designed to extract oxygen, nitrogen and argon from air

### Synthetic fibres

Glycol and methanol recovery from extraction water and nylon- 6 chips

### Coking plants

Ammonia strippers and de-acidification plants

### Food industry

- Rectifying plants for mashes
- Fractionating columns for fruit juices
- De-alcoholising of beer and wine products

▶  
Distillation columns  
for oxo-alcohols



## Our engineering services:

### Basic Engineering

- Balancing
- Process simulation with HYSIM, ASPEN and ChemCAD
- Dimensioning of columns, falling film evaporators, heat exchangers, piping, pumps, control technology
- Flow charts (CAD)

### Detail Engineering

- Design, shop drawings, space assignment plans, piping layouts
- Calculations of strength
- Structural calculations

### Execution

- Procurement
- Quality assurance
- Manufacture of columns, column internals and falling film evaporators

### Assembly

- Planning
- Supervision
- Execution

### Revamping

- Replacing trays and random packings in existing columns with Montz packings
- Planning and execution of modification works

### Montz plant engineering

- Plants and plant components for thermal fractionating technology
- Fractionating columns for isocyanates (TDI, MDI, MDA) in the chemical industry
- Fractionating columns and falling film evaporator plants for the purification of bisphenoles
- Columns to concentrate aliphatic alcohols.



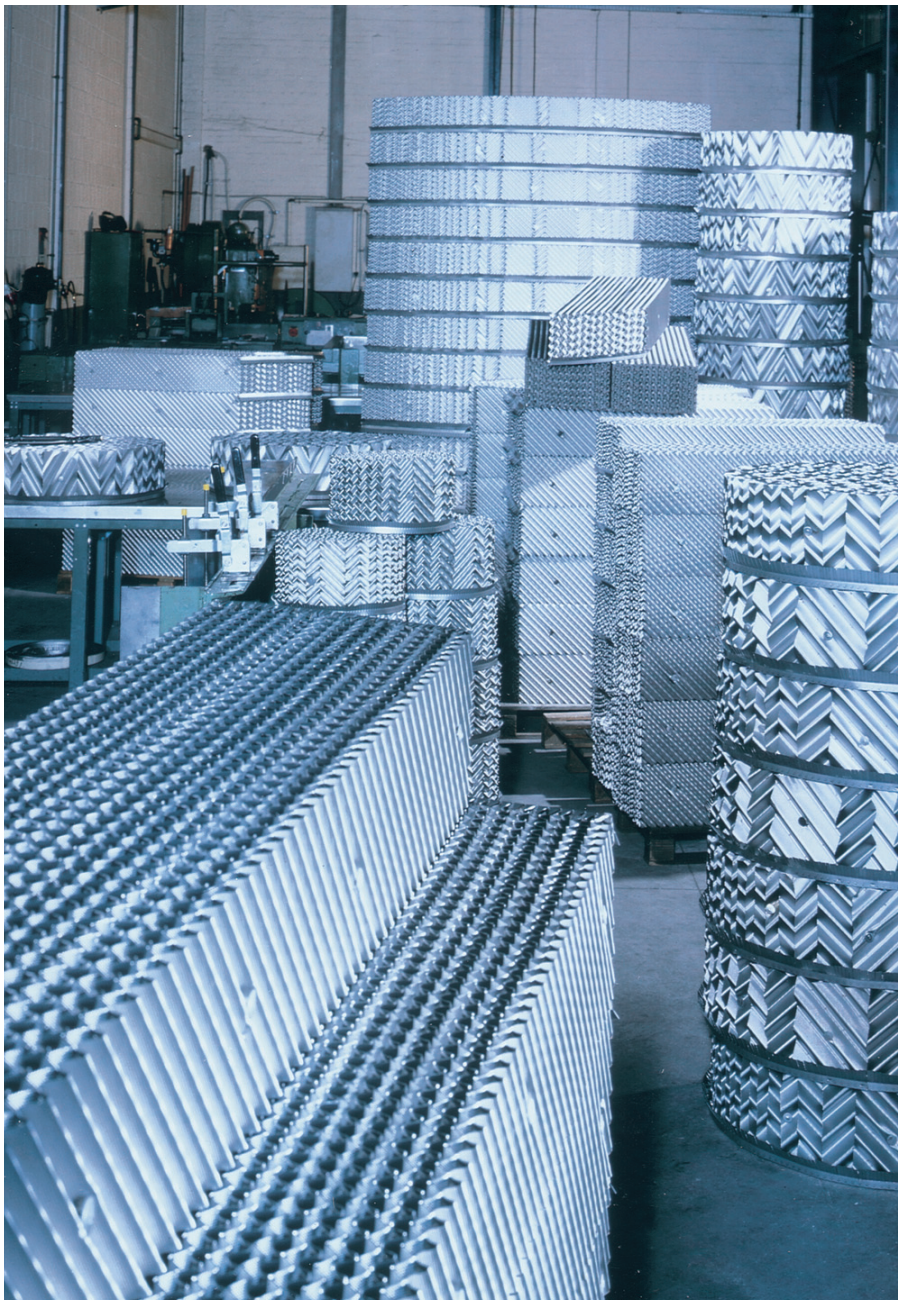
▶ Rectifying plant for butanol amines



# Montz structured packings

**A standard of quality in thermal fractionation**

**Montz structured packings have the nature to be a very efficient technique and to have a very flexible application range. The packings offer a high fractionation efficiency, a high throughput, a broad application area and a low pressure drop. The main application is distillation, desorption, absorption, direct heat exchange and liquid-liquid extraction.**



Montz structured packings have a widely variable geometrical shape and different surface structures. This concept enables highest flexibility when adjustments for different fractionation tasks are needed.

The structured packings Montz-Pak Type A3, B1, BSH, C1 and the new high-performance packings Type M and MN possess a basically similar shape: the packing body always consists of corrugated lamellae.

The corrugation of the lamellae run inclined to the vertical and build together with the neighbouring lamellae a cross-flow-channel system. With this structure, large specific surface areas and an intense interchange between gas and liquid phase is achieved.

To obtain the required results special column internals like liquid distributors, flash-equipment, liquid catchers, vapour distributors and supporting systems are necessary. All these internals are customized for each type of packing and requirement. Also, these internal underlie a strict and constant quality check.





▶ Packing element of Montz-Pak Type BSH-400 with wall wipers

▼ New generation of structured packings: Montz-Pak Type M



#### **The internals are**

- Liquid distributors with highest accuracy and a large operating range
- Collector trays with little pressure drop and low leaking ratio
- Vapour or gas distributors for an even distribution of the gas flow
- Flash boxes for feeding superheated liquids or gas-liquid mixtures
- Supporting systems with large open area ratios
- Wall wiper systems to avoid gas bypasses or liquid leaking streams and to adapt to diameter tolerances

A basic requirement for the high efficiency of Montz structured packings is their precise manufacturing.

The basic requirement for the high performance of Montz structured packings is a very precise production.

The packings are manufactured on computer controlled production lines, to enable a maximum of precision and mechanical stability.

The well fit-in and stability of Montz packings are the essential criteria for an economic and easy installation at revamping or newly built columns.

All types of packings manufactured by Montz are produced in segments and can be easily installed either through manways or shell flanges.



# Montz-Pak Type A3

**Special wire mesh packing for the fractionation of thermally instable substances in deep vacuum**

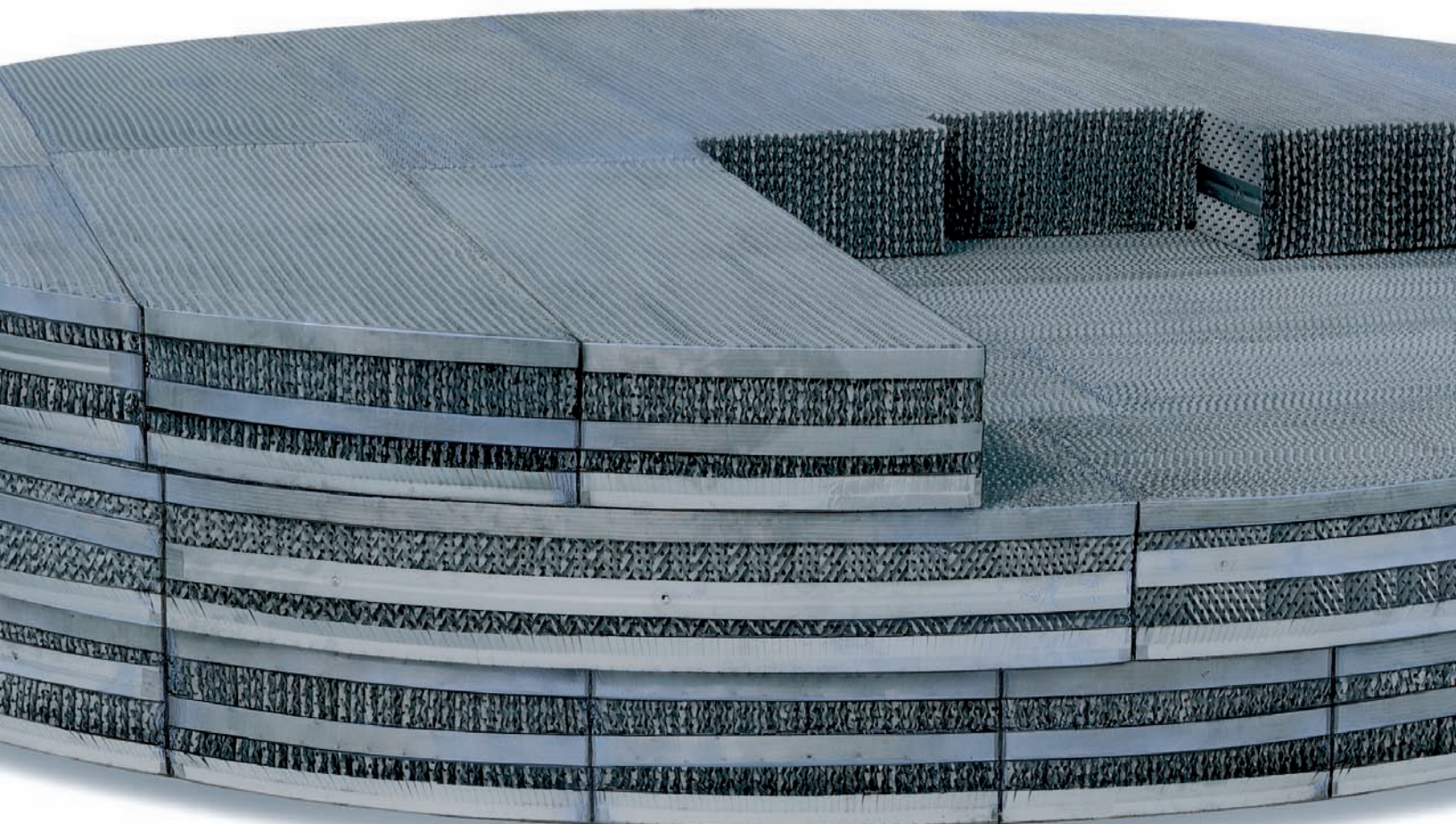
**Montz-Pak Type A3 in particular fulfils the special requirements demanded by the fractionation of thermally instable substances under vacuum conditions. This is achieved by a special wire mesh with a capillary effect. The wire mesh has the form of corrugated lamellae and builds up the packing layers. With its low pressure drop and its high fractionation efficiency this type of packing is also very suitable for very low liquid loads.**

## **Characteristics**

- Excellent suitability for vacuum columns
- Very low liquid loads (<100 l/(m<sup>2</sup>h)) are possible
- Low pressure drop per theoretical stage
- High fractionation efficiency because of good wettability of the packing surface
- Capillary effect of the special wire mesh

## **Applications**

The main area of application is in the fractionation of thermally instable substances, which are rectified under deep vacuum from approx. 0.5 mbar.





**Applications are:**

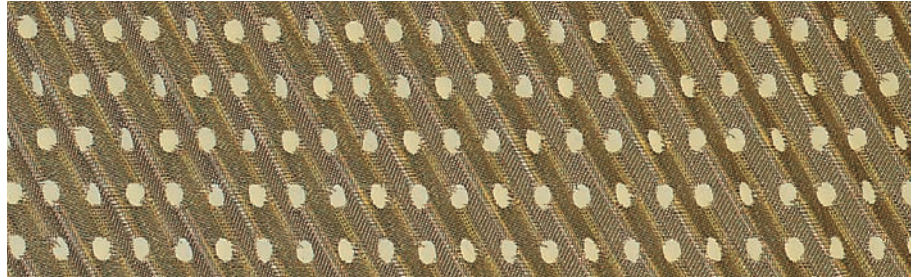
- Ethereal oils
- Isomer mixtures
- Fatty acids
- Fatty alcohols
- Deodorizing of edible oils
- Degassing of transformer oils
- Pilot columns

**Materials**

- Stainless steel for instance 410S, 304, 304L, 316, 316L, 316Ti, 904L
- Hastelloy C4, C22, C276, etc.
- Aluminium, copper, titanium, monel
- Further materials are available on request

**Column data**

- Column diameter starting from 20 mm up to 7 m and bigger
- Liquid loading starting from 20 l/(m<sup>2</sup>h)
- Operating pressures from approx. 0.5 mbara
- Minimal liquid hold-up



▲  
Montz-Pak Type A3-500

**Inclination angle of the corrugation**

- Standard type with 60°
- 45° or other angles on request

**Fractionating stages**

In case of the usage of mixtures of well wetting liquids one can obtain approx. 5 to 20 theoretical stages per meter in technical columns, depending on the packing surface.

**Assembly**

The packing layers are manufactured either in one piece or in segments. The installation in the column is carried out through shell flanges or manways, through shell flanges or through manholes.



◀  
Structure of a Montz-Pak Type A3-500 with a diameter of 3000 mm

Pak-Type	Specific surface m <sup>2</sup> /m <sup>3</sup>
<b>A3-500</b>	<b>500</b>
<b>A3-750</b>	<b>750</b>
<b>A3-1000</b>	<b>1000</b>
<b>A3-1200</b>	<b>1200</b>
<b>A3-1500</b>	<b>1500</b>
<b>A3-1900</b>	<b>1900</b>

Other surface area sizes are available on request



# Montz-Pak Type B1

## The efficient metal sheet packing

**Montz-Pak Type B1 is a result of many years of experience and development in the field of thermal fractionation technology with structured packings. Montz-Pak Type B1 has proven its reliability in many technical applications. The excellent characteristics are due to the regular arrangement and the special Montz surface structure.**

### Characteristics

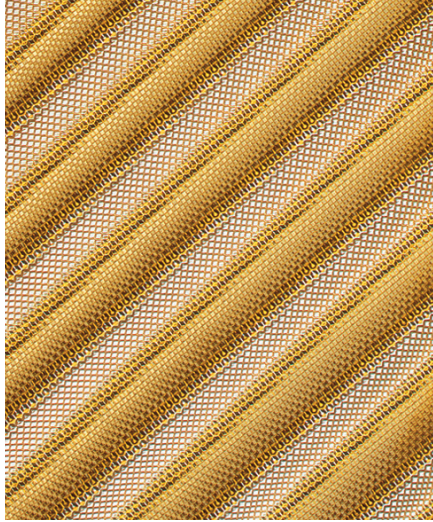
- High throughput
- High flexibility
- High efficiency
- Low pressure drop
- Liquid loads from 0.1 to 250  $\text{m}^3/(\text{m}^2\text{h})$  and more
- Adaptability to any fractionation step by a variable specific surface

### Applications

- Vacuum columns
- Normal pressure and high pressure columns
- Absorption of components and pollutants from gas or air flows
- Natural gas drying with glycols
- Refinery columns (atmospheric and under vacuum)
- Petrochemical columns
- Exhaust air washing in aluminium rolling mills
- Recovery of lubricating and rolling oil
- Waste water treatment with stripping columns
- Revamping of existing tray or random packed columns to improve the performance and capacity







◀  
Montz-Pak Type B1: 45° and 60° angle of inclination of the corrugation (left to right)

#### Standard type (45°)

Pak-Type	spec. surface m <sup>2</sup> /m <sup>3</sup>
B1- 65	65
B1-100	100
B1-125	125
B1-150	150
B1-200	200
B1-250	250
B1-300	300
B1-350	350
B1-500	500
B1-750	750

#### Type for high throughputs (60°)

Pak-Type	spec. surface m <sup>2</sup> /m <sup>3</sup>
B1- 65.60	65
B1-100.60	100
B1-125.60	125
B1-150.60	150
B1-200.60	200
B1-250.60	250
B1-300.60	300
B1-350.60	350
B1-500.60	500

Other surface area sizes are available on request

#### Materials

- Stainless steel for instance 410S, 304, 316, 316Ti, 316L, 904L
- Hastelloy C4, C22, C276, etc
- Carbon steel
- Aluminium, copper, titanium, monel
- Further materials are available on request

#### Column Data

- Column diameter starting from 20 mm up to 11 m and bigger
- Liquid load from 40 l/(m<sup>2</sup>h)
- Operating pressures from vacuum to more than 100 bara
- Minimal liquid hold-up

#### Revamping

The performance and capacity of existing columns like e.g. crude oil columns, natural gas dryers, vacuum distillations (for fatty alcohols, fatty acids, methyl esters etc.) can be increased by revamping.

#### Inclination angle of the corrugation

- Standard type with 45°
- 60° for high liquid throughput and direct heat transfer in condensation beds

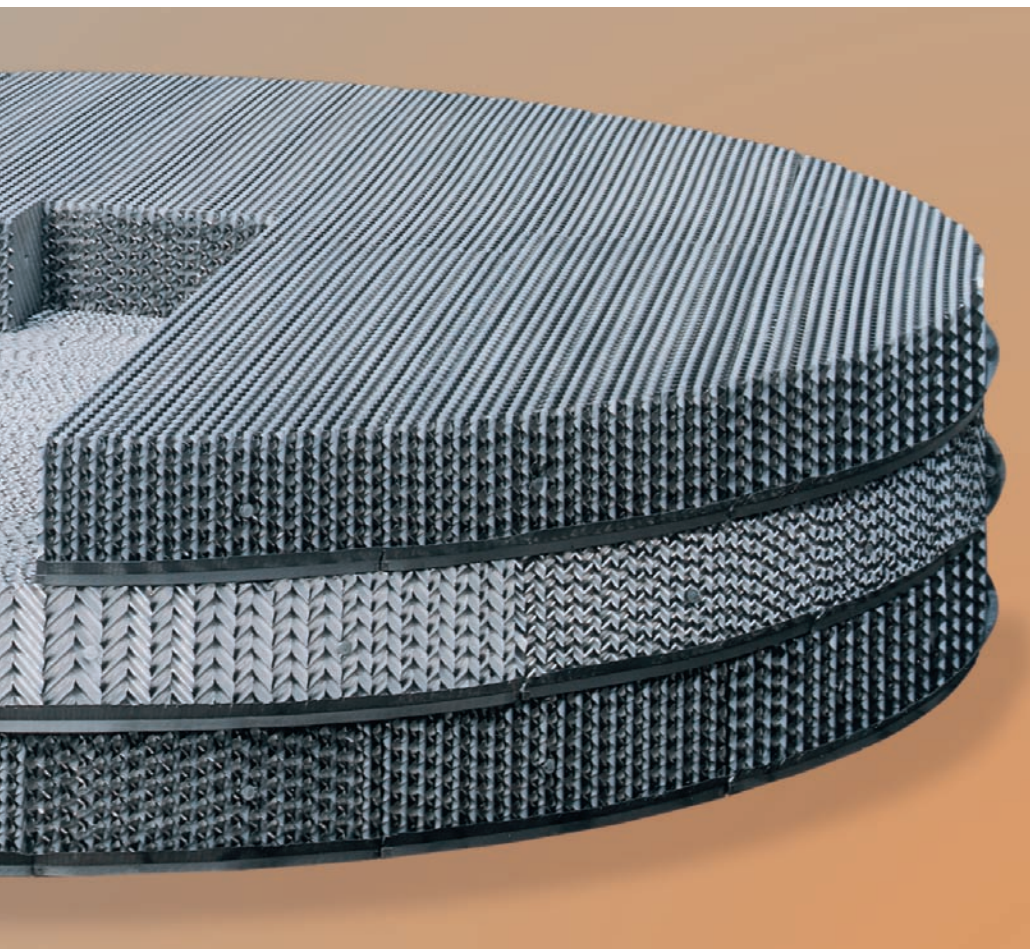
#### Fractionating stages

Depending on design more than 5 theoretical stages per meter can be obtained.

#### Assembly

The packing layers are manufactured either in one piece or in segments. The installation in the column is carried out through shell flanges or manways.

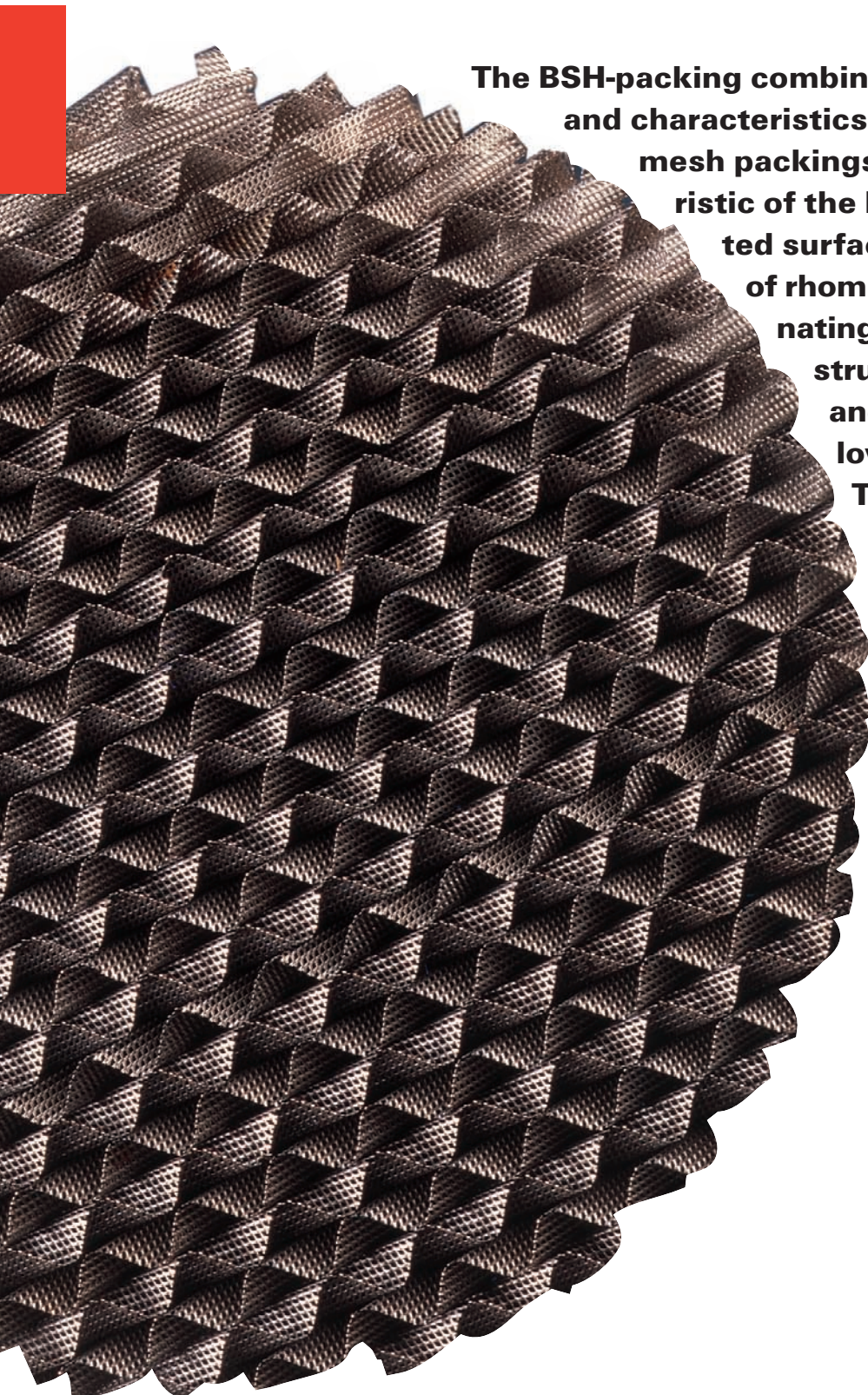
◀  
Montz-Pak Type B1-250,  
Diameter 4000 mm





# Montz-Pak Type BSH

High-performance packing for thermal mass transfer



The BSH-packing combines the essential features and characteristics of metal sheet and wire mesh packings. A remarkable characteristic of the BSH-packing is the patented surface structure which consists of rhombic perforations with alternating burred-up edges. This structure ensures an excellent and uniform wetting under lowest and high liquid loads. Turbulences caused by the burred-up rims of the orifice ensure a permanent mixing of the liquid film on the packing surface.

- Liquid loads 0.04 up to more than 150 m<sup>3</sup>/(m<sup>2</sup>h)
- Low pressure drop
- Solutions for any fractionation problem thanks to a variable specific surface

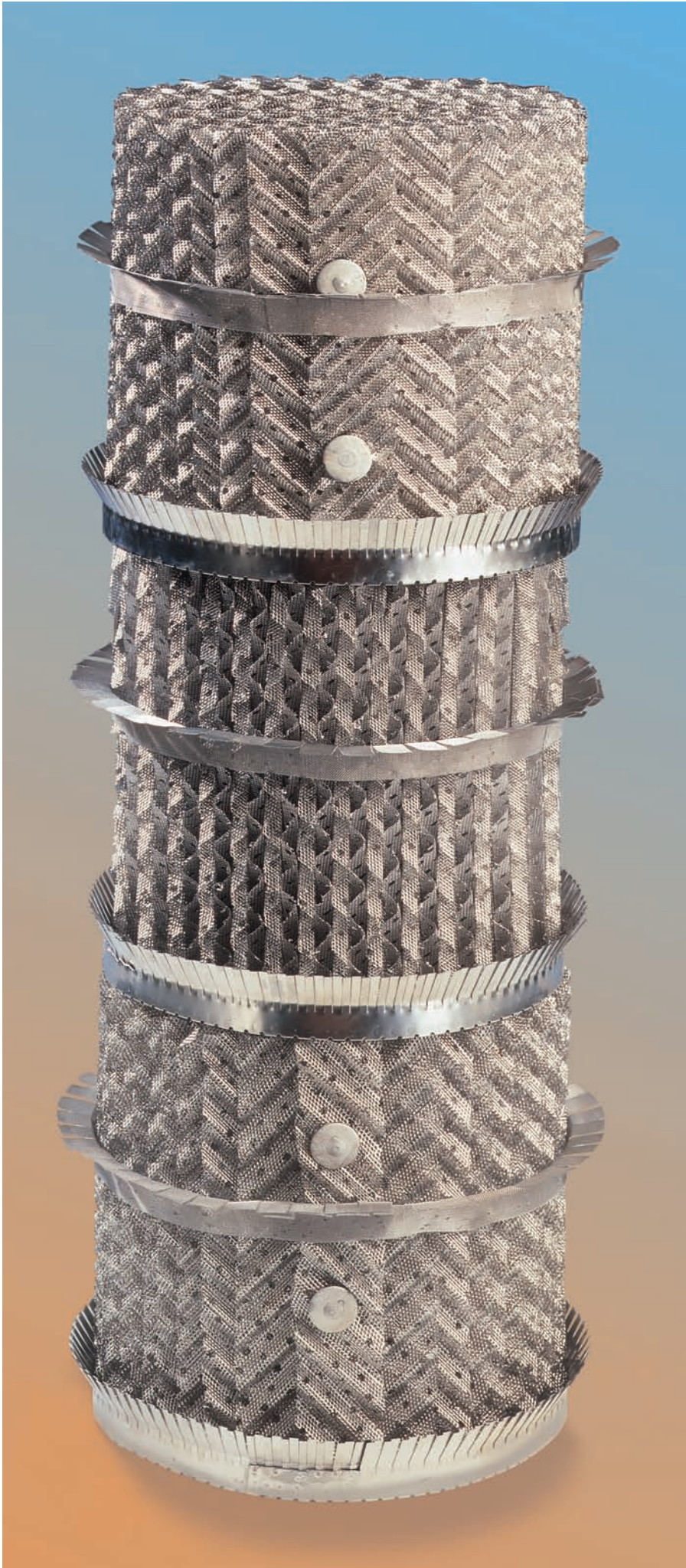
#### Applications

- Vacuum columns
- Normal pressure and high pressure columns
- Absorption
- Natural gas drying
- Refinery columns
- Petrochemical columns
- Columns dealcoholisation of beer or wineproducts
- Waste water stripping columns
- Fractionating columns for the chemical industry
- Revamping of existing tray or random packed columns to improve the performance and capacity

#### Characteristics

- High capacity and flexibility
- Good wettability, thus ensuring excellent contact surfaces between vapour and liquid
- High fractionation efficiency almost up to capacity limit of the packing





◀  
Montz-Pak Type BSH-400

**Materials**

- Stainless steel for instance 410S, 304, 316, 316Ti, 316L, 904L
- Hastelloy C4, C22, C276, etc
- Aluminium, copper, titanium, monel
- Further materials are available on request

**Column data**

- Column diameter starting from 40 mm to 11 m and bigger
- Liquid load from 40 l/(m<sup>2</sup>h)
- Operating pressures from vacuum up to 100 bara
- Minimal liquid hold-up

<b>Angles of inclination of the corrugations</b>	
<b>Standard design (45°)</b>	
Pak-Type	Spec. surface m <sup>2</sup> /m <sup>3</sup>
BSH-350	350
BSH-400	400
BSH-500	500
<b>Design for high throughputs (60°)</b>	
Pak-Type	Spec. surface m <sup>2</sup> /m <sup>3</sup>
BSH-350.60	350
BSH-400.60	400
BSH-500.60	500

Other surface area sizes are available on request

**Fractionation stages**

Depending on the design more than 8 theoretical stages per meter can be obtained.

**Assembly**

The packing layers are manufactured either in one piece or in segments. The installation in the column is carried out through shell flanges or manmays.



# Montz-Pak Type C1

**Plastic packings made of PTFE for fractionation of corrosive substances**

**Montz-Pak Type C1 is made of pure PTFE and is a structured mass transfer packing with a specific surface of 300 m<sup>2</sup>/m<sup>3</sup>. The C1 packings are manufactured in the form of cylindrical packing elements for small diameters and in segments for larger diameters. The individual packing layers are stiffened by a metallic basket.**

## **Characteristics**

The packing's structure of Montz-Pak Type C1 is very similar to that of the B1 packing so that the pressure drop and fractionation characteristics are comparable, too.

## **Applications**

The C1 packings can be used in columns for: distillation, absorption, desorption and liquid-liquid extraction.

## **Material**

The distributor and support system for C1 packings are made of e.g. Hastelloy C4 or B2, titanium or tantalum.



Montz-Pak Type C1



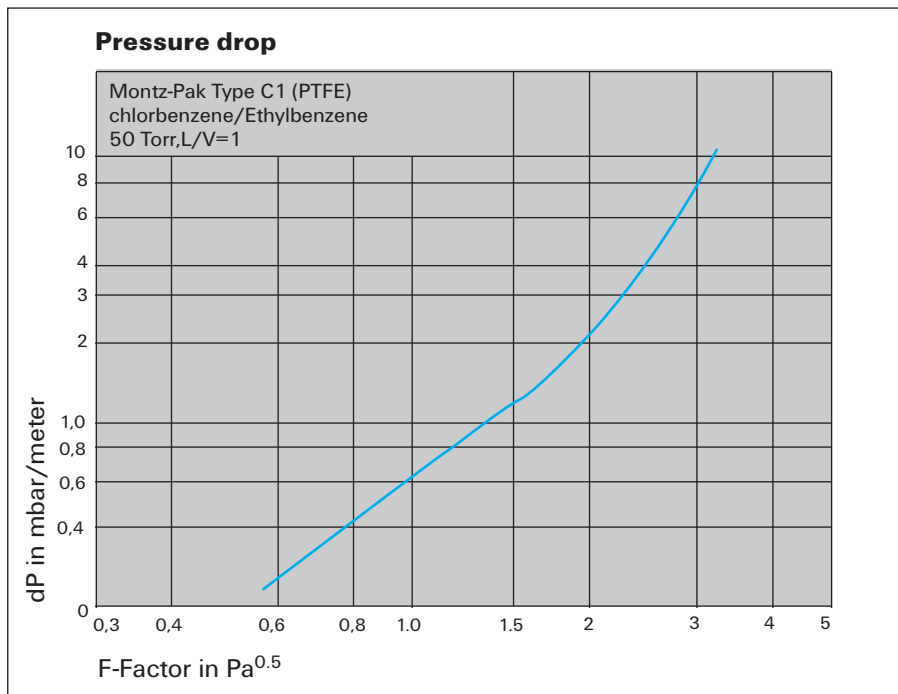
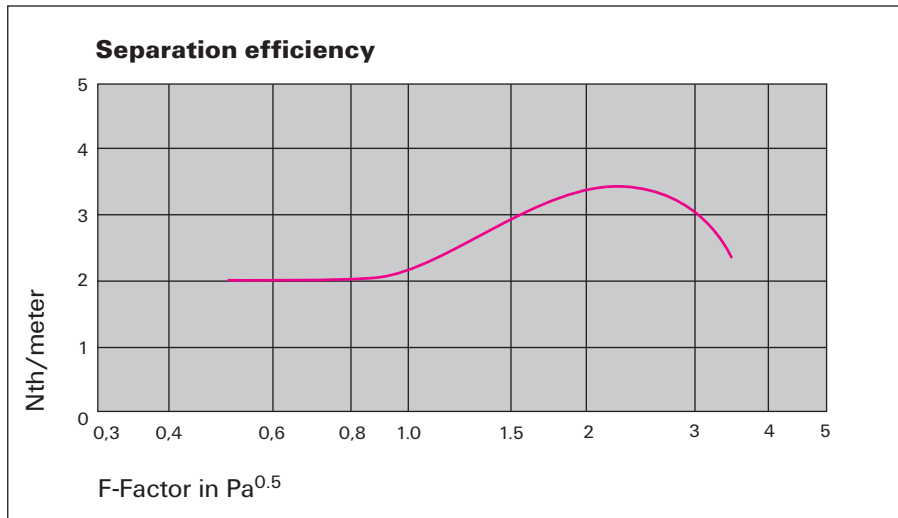
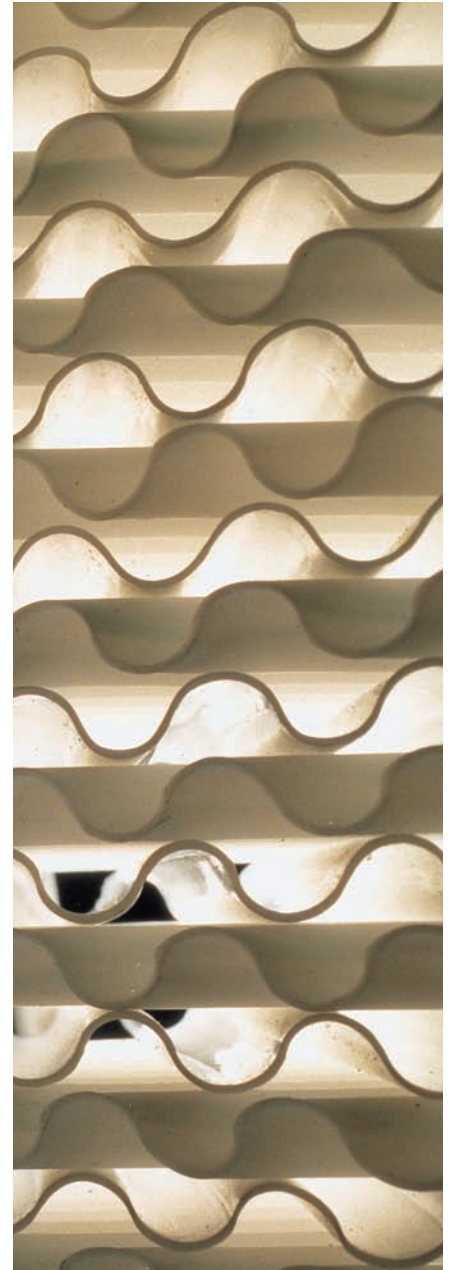
### Column data

- Operating temperature up to 130°C
- Liquid loads approx. 2 to 150 m<sup>3</sup>/(m<sup>2</sup>h)
- Specific surface 300 m<sup>2</sup>/m<sup>3</sup>
- The smallest diameter is approx. 60 mm. Up to a diameter of 1.5 m the packing elements can be produced in one piece. Production in segments is possible from diameters of approx. 800 mm.

### Separation stages and dimensioning

More than two theoretical stages per meter can be obtained when used in technical columns. The separation efficiency of C1 packings depends largely on the wettability and liquid load.

Please contact Montz to determine the separation stages and diameters for a specific separation problem.



Structure of Montz-Pak Type C1



# Charts

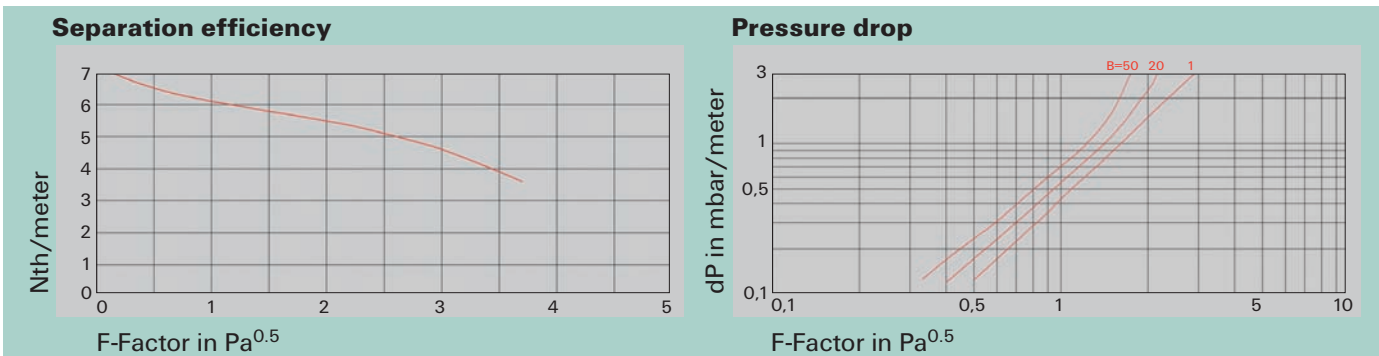
## Separation efficiency and pressure drop in an overview

The following charts will give you the opportunity to convince yourself of the performance of our most important types of structured packings. These charts give you a wide overview of the separation efficiency and the pressure drop of our premium products. Further types of packings as well as further information about individual solutions are always available on request.

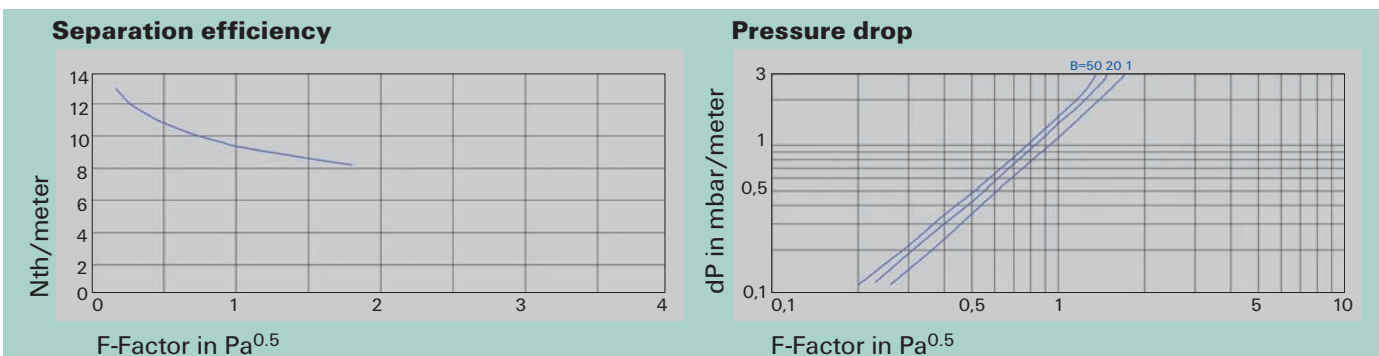
Separation efficiency is shown by the use of the test system chloro-/ethylbenzene at ambient pressure. The pressure drop is displayed by the use of the test system air/water at different specific liquid loads.

Liquid load  $B$  in  $\text{m}^3/(\text{m}^2\text{h})$

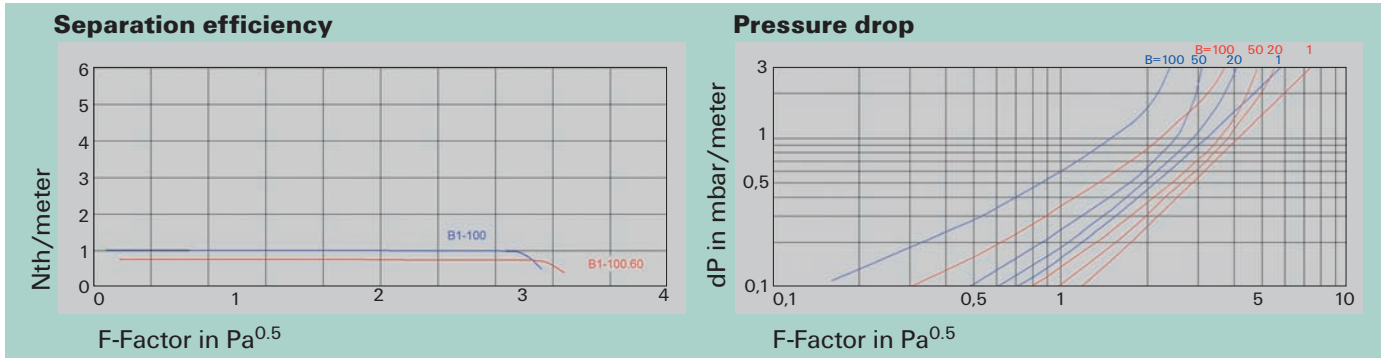
### Montz-Pak Type A3-500



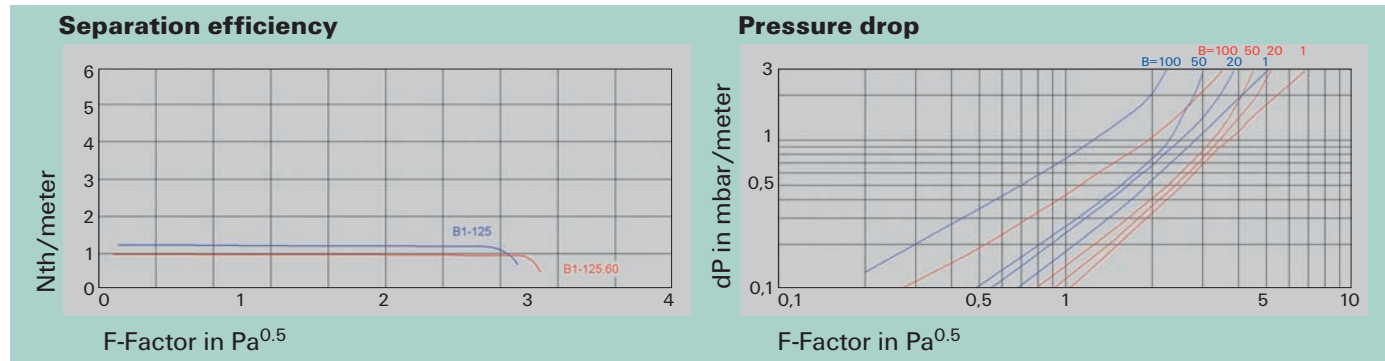
### Montz-Pak Type A3-750



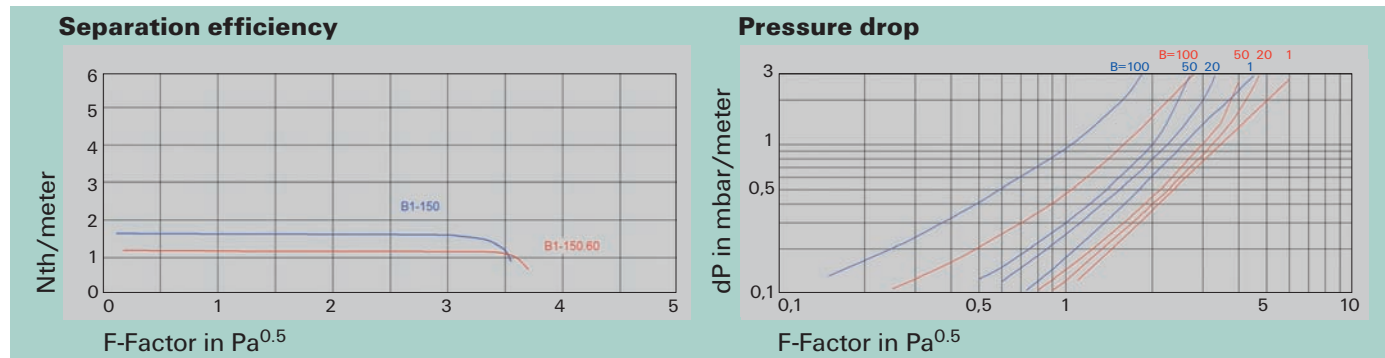
## Montz-Pak Type B1-100



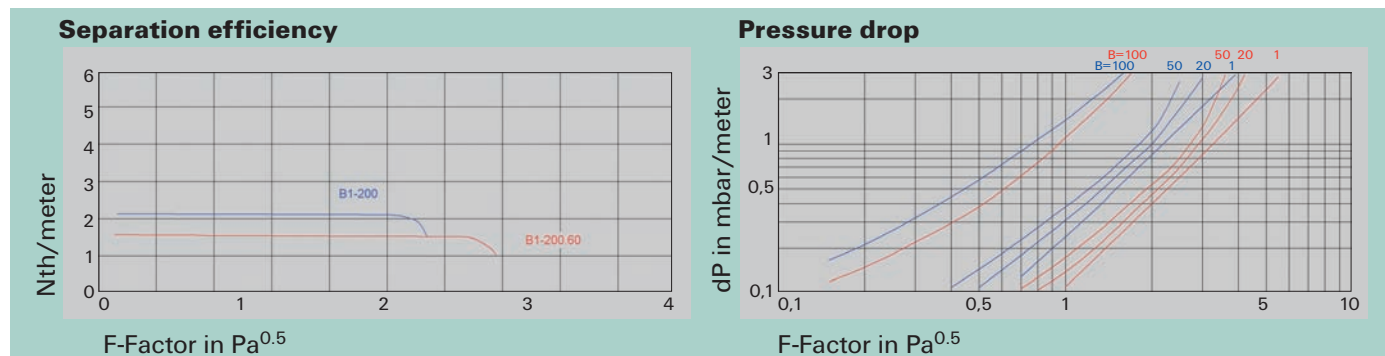
## Montz-Pak Type B1-125



## Montz-Pak Type B1-150



## Montz-Pak Type B1-200

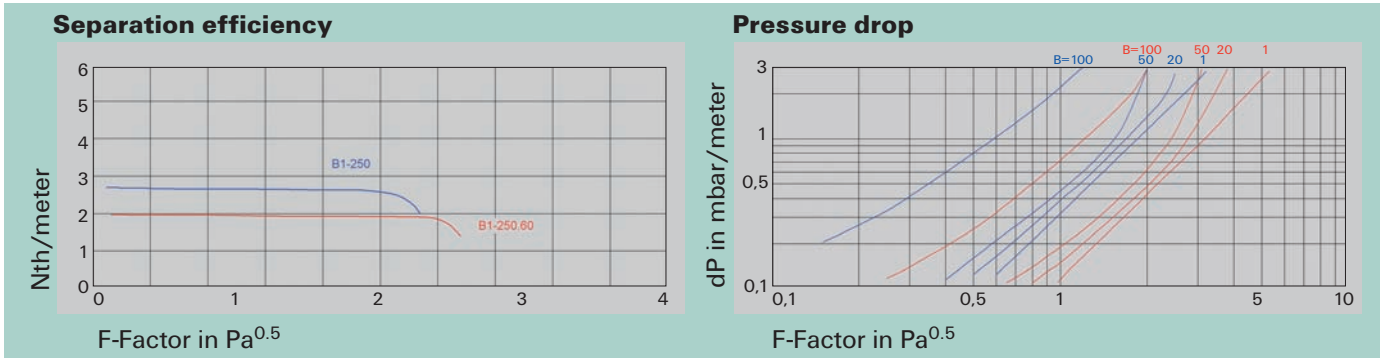




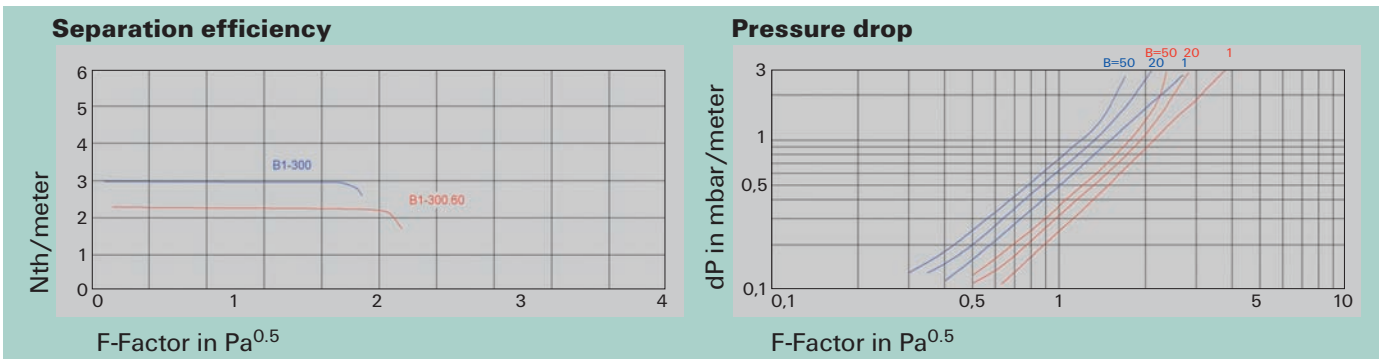
# Charts

## Separation efficiency and pressure drop in an overview

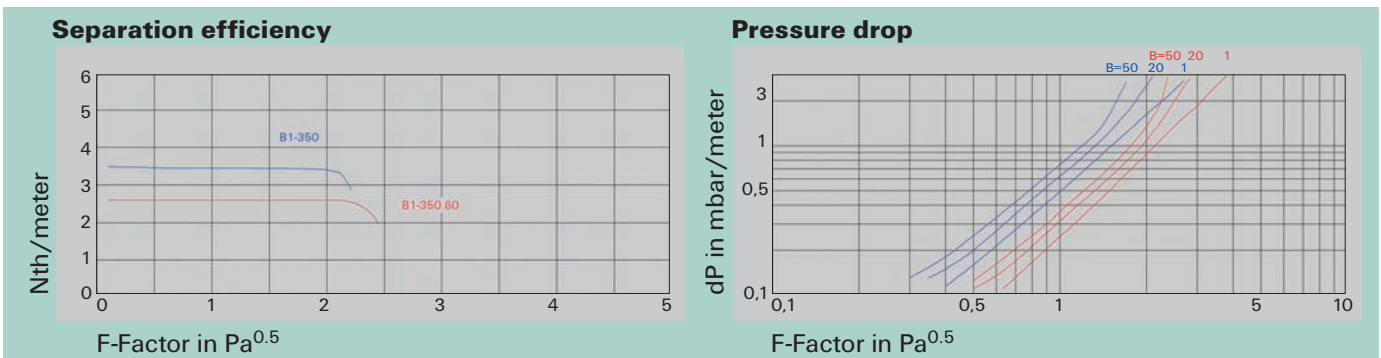
### Montz-Pak Type B1-250



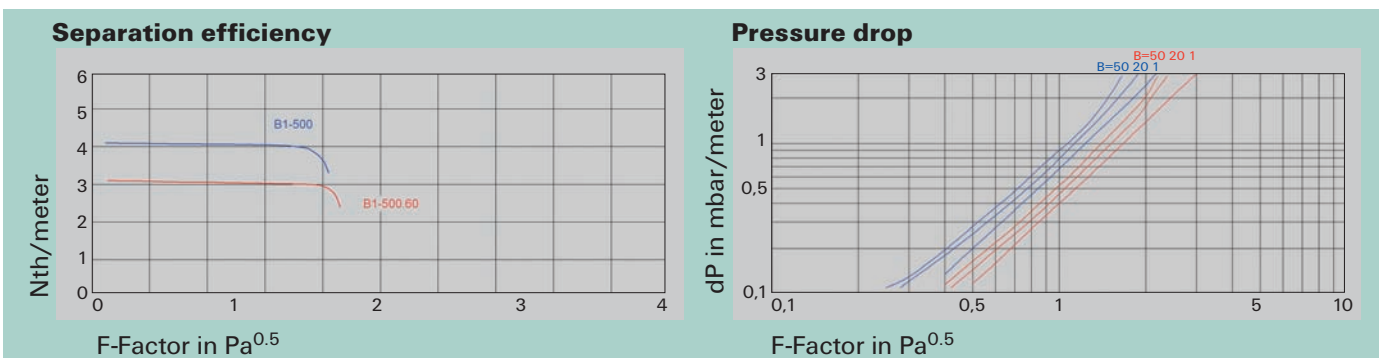
### Montz-Pak Type B1-300



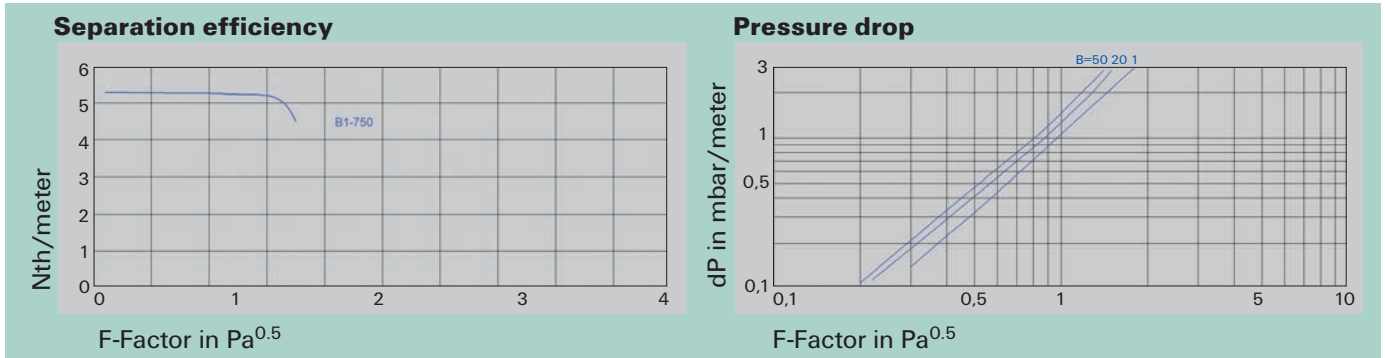
### Montz-Pak Type B1-350



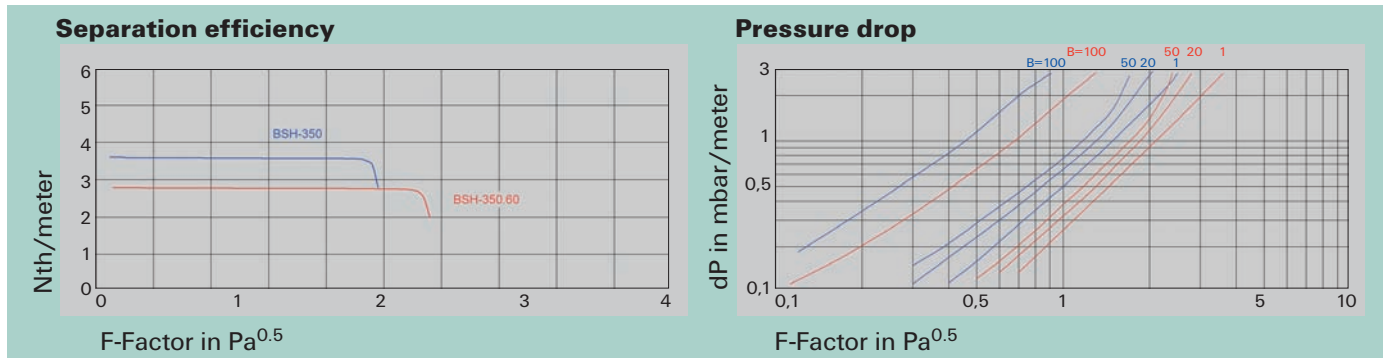
### Montz-Pak Type B1-500



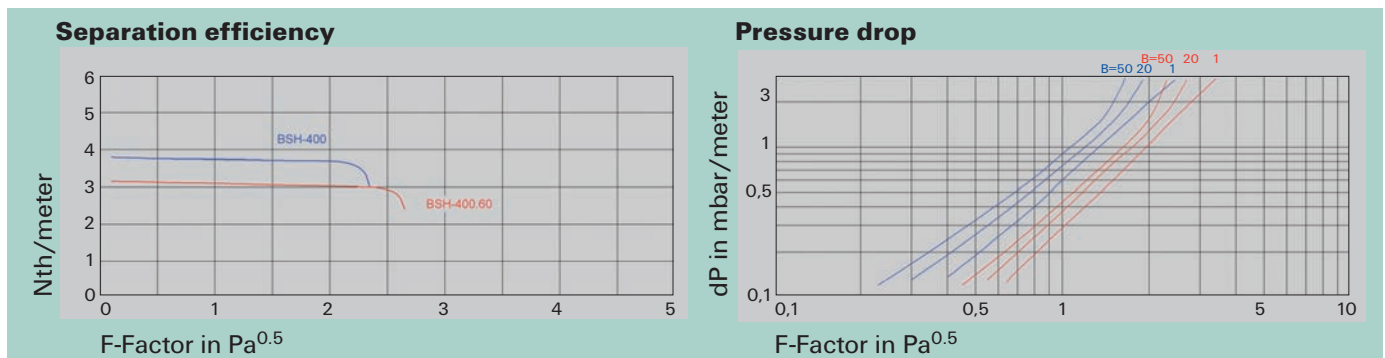
## Montz-Pak Type B1-750



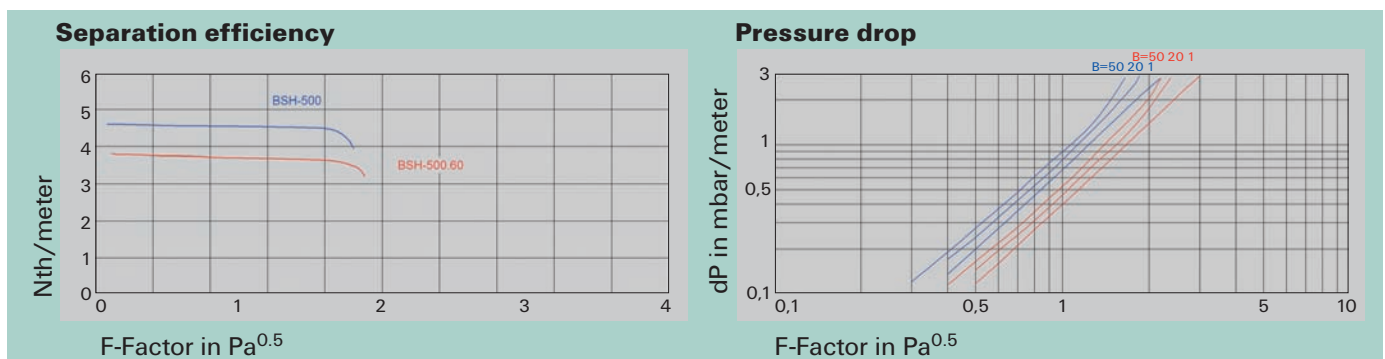
## Montz-Pak Type BSH-350



## Montz-Pak Type BSH-400



## Montz-Pak Type BSH-500





# Montz-Pak Type MN/M

The new generation of high performance packings

**The Montz-Pak Type M and MN are further developments of the tried and trusted Montz structured packing Type B1, A3 and BSH with its own patent coverage.**

The optimized curved geometry creates two types of packings that improve either throughput or the separation efficiency by some 30%.

Both models of packings have patented, in height variable shapes of waves, which prevents a liquid hold up at high gas loads on the bottom packing end.

The packings can be characterised as following:

#### **MN-Packings**

compared to the usual packings have an increased separation efficiency of up to 30% at a higher throughput or reduced pressure drop. Hence higher quality in products and smaller heights of columns are achievable.

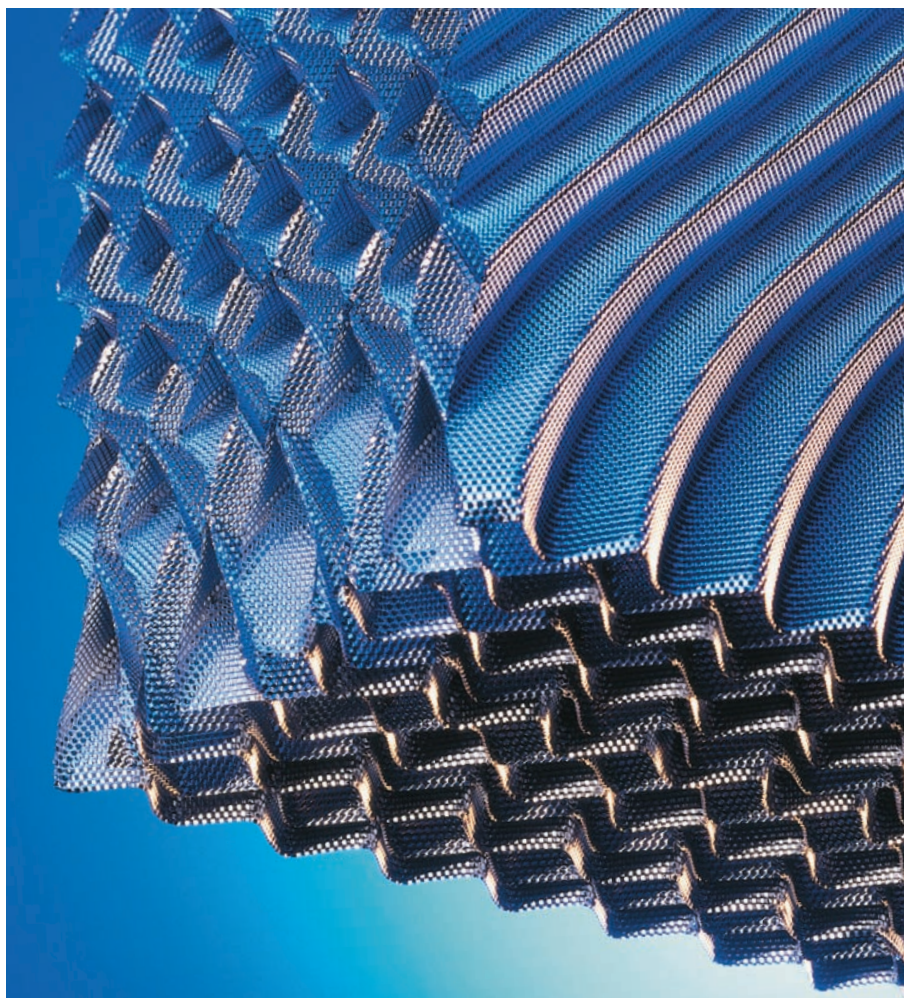
#### **M-Packings**

are especially suitable for increasing the throughput of up to 30% in existing columns. They enable a reduced pressure drop at almost equal separation efficiency.

The field of application are new columns, grass root plants or revamping existing units.

Montz-Paks Type M and Type MN are protected by international and national patents.

The following high performance packings are available:



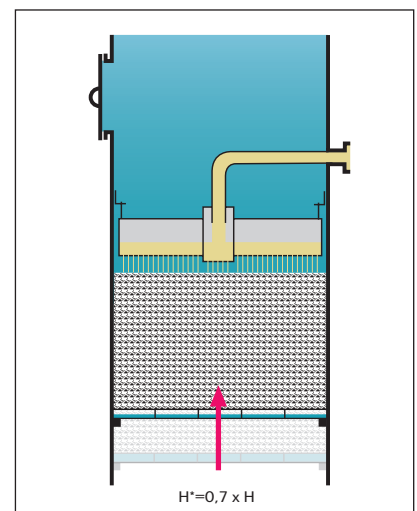
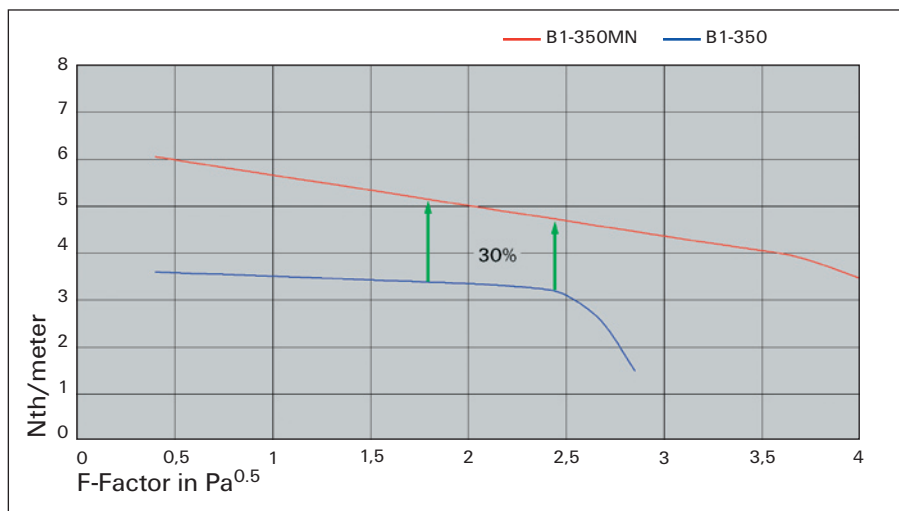
Pak-Type	Surface area m <sup>2</sup> /m <sup>3</sup>
<b>B1-250MN</b>	<b>250</b>
<b>B1-350MN</b>	<b>350</b>
<b>B1-500MN</b>	<b>500</b>
<b>B1-175M</b>	<b>175</b>
<b>B1-250M</b>	<b>250</b>
<b>B1-350M</b>	<b>350</b>
<b>A3-500M</b>	<b>500</b>
<b>A3-750M</b>	<b>750</b>

◀ Structure of the Montz Pak Type M

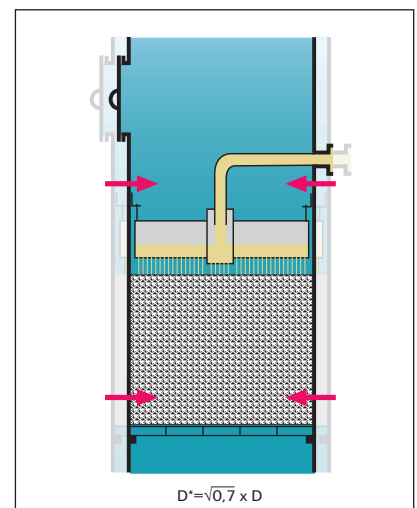
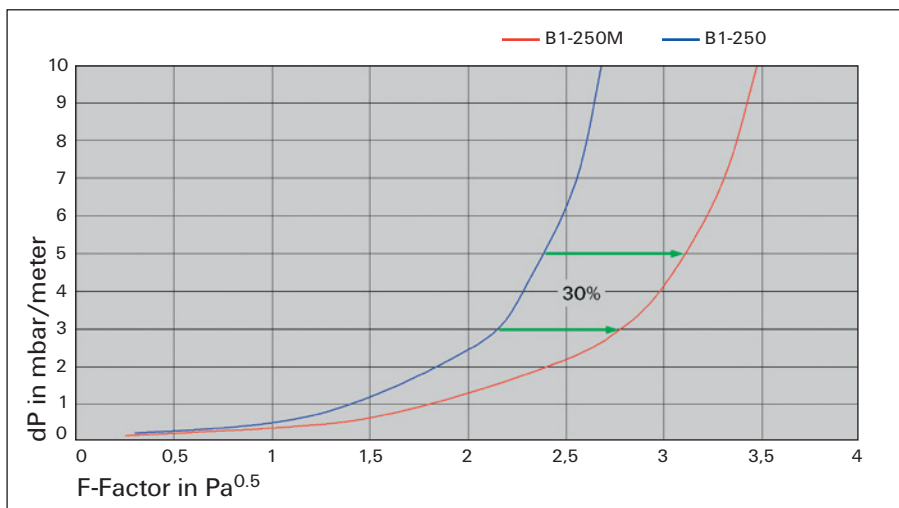
**Montz-Paks type M and MN offer an advantage in investment costs at new building of columns regarding diameters and heights. Through the increase of separation efficiency as well as the throughput columns with a smaller diameters and/or height are possible.**

At revamping of existing columns the advantages have a direct effect on the process. Existing plants can run on higher throughputs, can have better product qualities or can have reduced energy-costs due to the reduced pressure drop.

Example in the increase in separation efficiency comparing B1-350MN and B1-350 packings. Test system is chlorobenzol/ethylbenzol at total reflux.



Example of the capacity advantage comparing B1-250M and B1-250 packings. Test system is cyclohexane/n-heptane.





# Type MN

An increase in separation efficiency of 30%

**Characteristics and fields of application of the high-performance packings type M and MN are basically not different from those of the comparable standard packings. Current working experience and areas of application remain valid.**

## Characteristics

- Higher throughput
- High flexibility
- Large separation efficiency up to capacity limits
- Liquid loads of 0.1 up to 250 m<sup>3</sup>/(m<sup>2</sup>h)

## Application fields

- Vacuum columns
- Normal pressure and high pressure columns
- Absorption of components and pollutants out of gas- and air-streams
- Natural gas drying with glycols
- Refinery columns (atmospheric and vacuum)
- Petrochemical columns
- Exhaust air treatment in aluminium rolling mills
- Lubricating and rolling oil treatment
- Sewage stripper

## Materials

- Stainless steel for instance 410S, 304, 316, 316Ti, 316L, 904L and other
- C-steels
- Hastelloy C4, C22, C276, etc
- Aluminium, copper, titanium, monel
- Further materials are available on request

## Column data

- Diameters from 40 mm up to 10 m and bigger
- Liquid loads from 100 l/(m<sup>2</sup>h)
- Working pressures from vacuum to more than 100 bara
- Minimal liquid hold-up

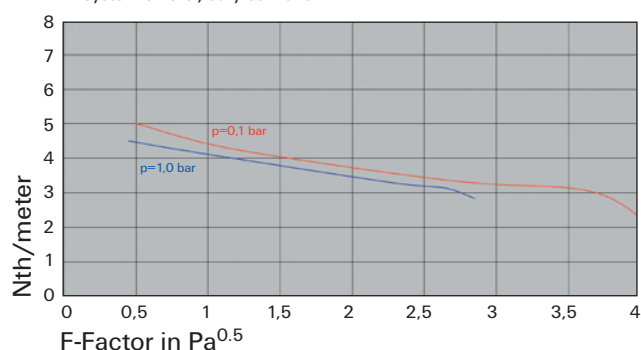
## Assembly

The packing layers are manufactured either in one piece or in segments. The installation in the column is carried out through shell flanges or manways.

## Montz-Pak Type B1-250MN

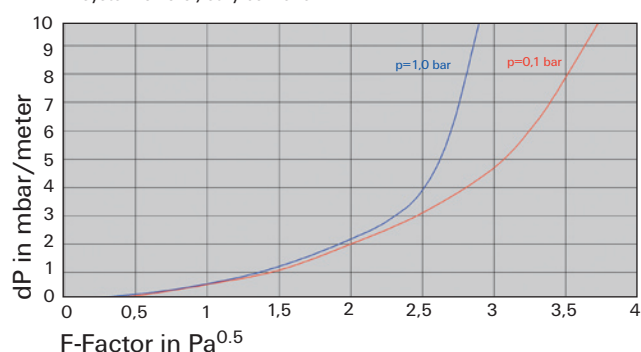
### Separation efficiency

in system chloro-/ethylbenzene



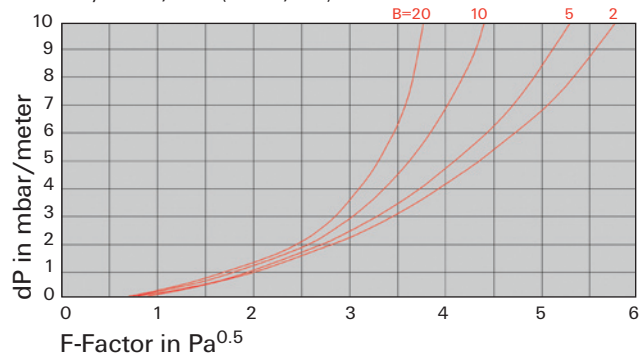
### Pressure drop

in system chloro-/ethylbenzene

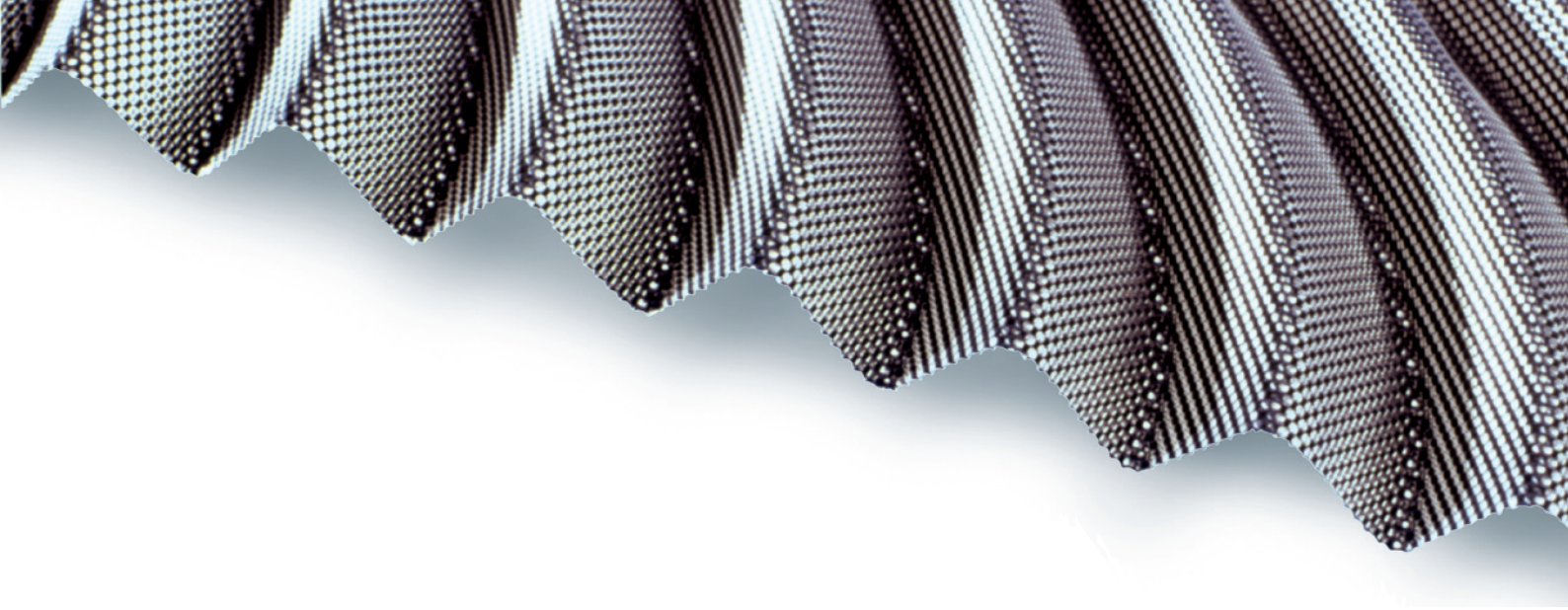


### Pressure drop

in system air/water (B in m<sup>2</sup>/m<sup>2</sup>h)

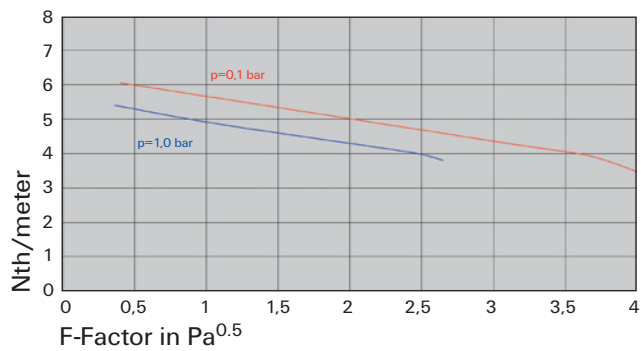




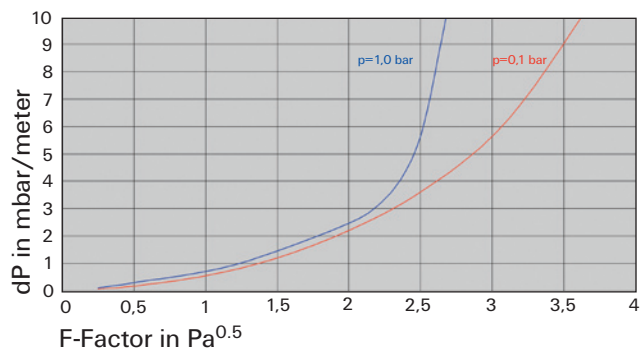


### Montz-Pak Type B1-350MN

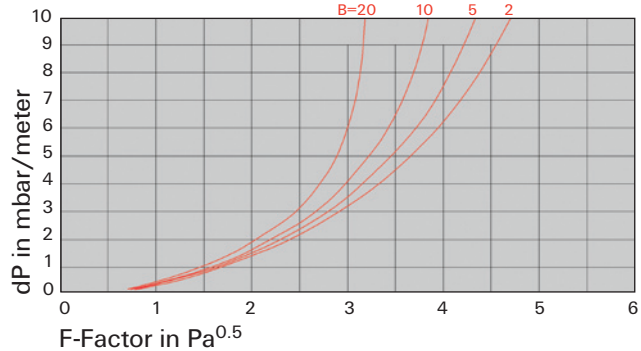
#### Separation efficiency in system chloro-/ethylbenzene



#### Pressure drop in system chloro-/ethylbenzene

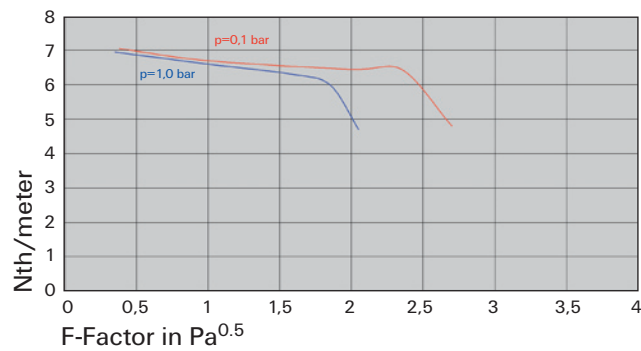


#### Pressure drop in system air/water (B in m<sup>2</sup>/m<sup>2</sup>h)

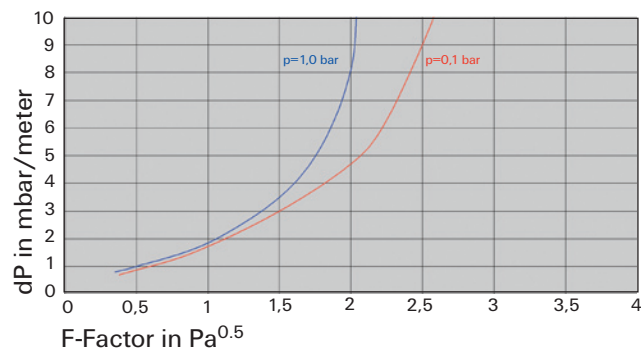


### Montz-Pak Type B1-500MN

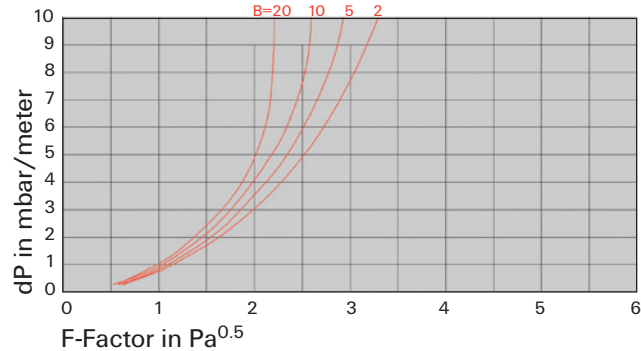
#### Separation efficiency in system chloro-/ethylbenzene



#### Pressure drop in system chloro-/ethylbenzene



#### Pressure drop in system air/water (B in m<sup>2</sup>/m<sup>2</sup>h)



# Type M

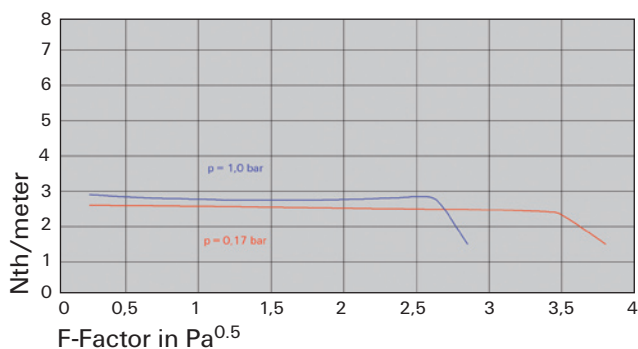
Throughput increase of 30%

Performance data of a test distillation unit DN 450

## Montz-Pak Type B1-250M

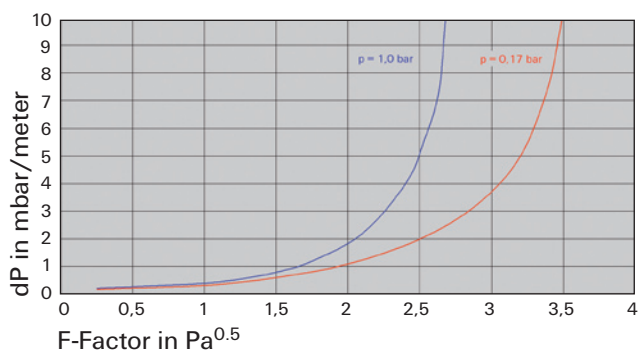
### Separation efficiency

in system cyclohexane / n-heptane



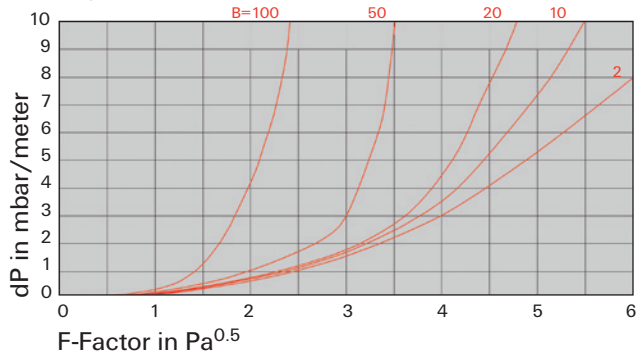
### Pressure drop

in system cyclohexane / n-heptane



### Pressure drop

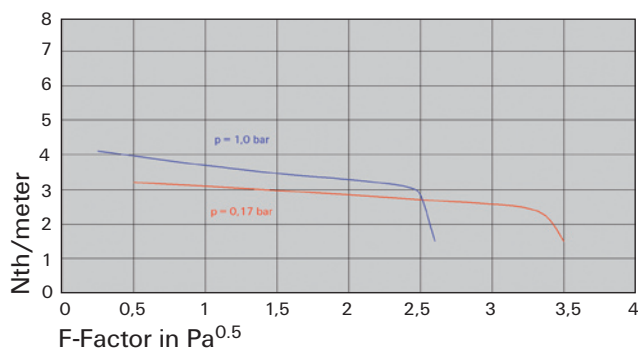
in system air/water (B in m<sup>3</sup>/m<sup>2</sup>h)



## Montz-Pak Type B1-350M

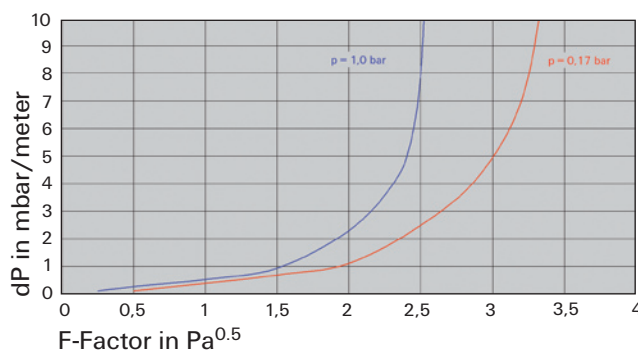
### Separation efficiency

in system cyclohexane / n-heptane



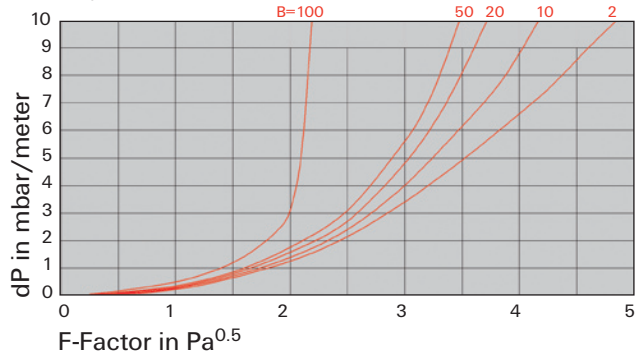
### Pressure drop

in system cyclohexane / n-heptane



### Pressure drop

in system air/water (B in m<sup>3</sup>/m<sup>2</sup>h)





# Montz-Pak Type A3-500M

Lowest pressure drop at high separation efficiency

The A3-500M packing offers a reduced pressure drop of 20% compared to the standard Montz-Pak type A3-500.

Because of the flow-optimised corrugation, higher throughputs, smaller pressure drops or reduced column diameters are possible. The A3-500M is especially suitable for application in deep vacuum and for smallest liquid loads.

## Characteristics

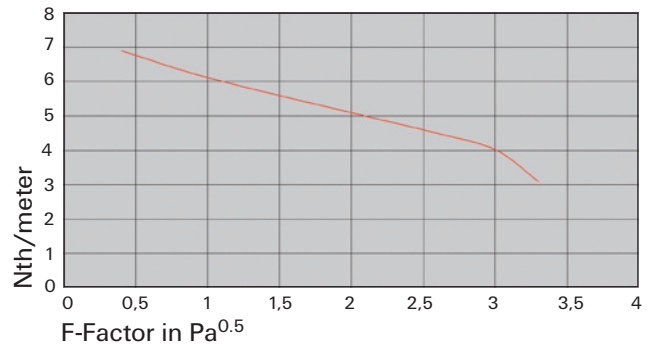
- Little pressure drop per fractionation stage
- High capacity
- Same separation efficiency as standard A3-500

## Application

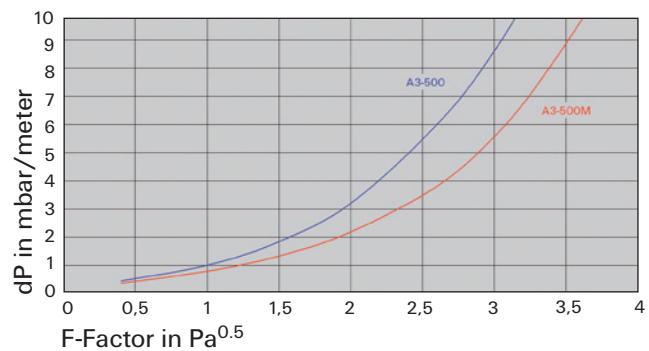
The area of application is mainly in the field of fractionation of thermally instable substances which are rectified under vacuum from about 0.5 mbara.

## Montz-Pak Type A3-500M

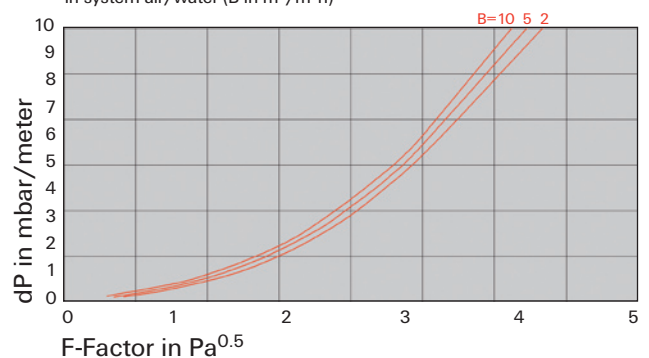
### Separation efficiency in system chloro-/ethylbenzene



### Pressure drop in system chloro-/ethylbenzene

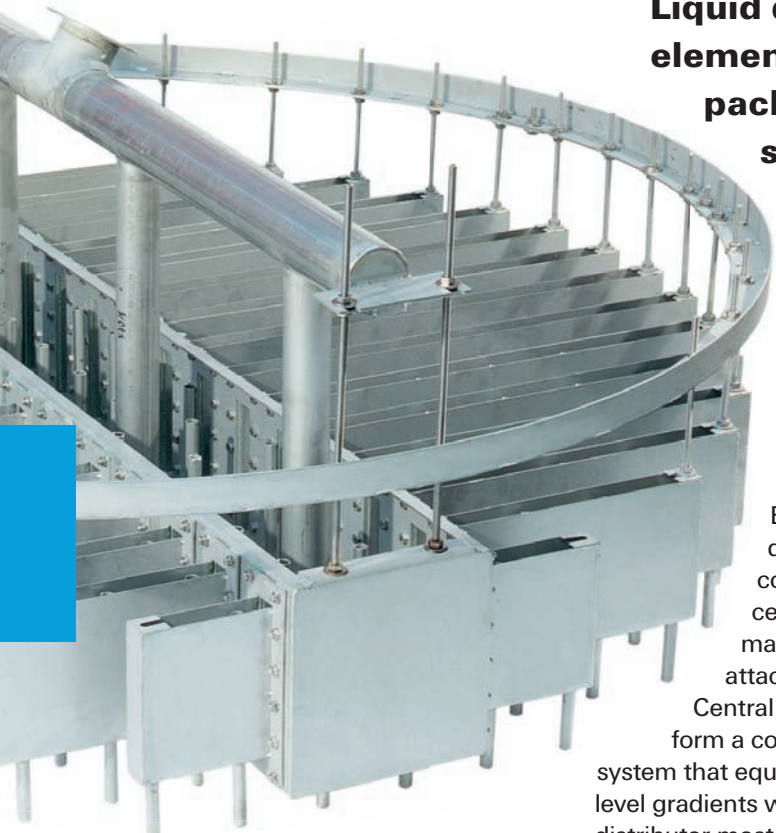


### Pressure drop in system air/water (B in m<sup>3</sup>/m<sup>2</sup>h)



# Liquid distributors

Know-how from Montz for maximum separation performance



**Liquid distributors are the most important elements in rectifying columns with structured packings. The high separation efficiency of structured packings can only be achieved with high-precision liquid distributors. Over the years, Julius Montz has gained the know-how necessary to design most efficient liquid distributors.**

Each of the distributors consists of a centrally arranged main trough with attached side troughs. Central and side troughs form a communicating system that equalizes liquid level gradients within the distributor most efficiently.

Each individual trough is fixed to a support ring, which is itself fixed to the column wall (i.e. the distributor is not resting on the packing bed). All troughs are individually and exactly adjustable to be in level over the column diameter. The liquid is then fed via a pre-distributing system into the main trough of the distributor. The assembly can easily be carried out through manways or shell flanges.

◀  
Montz-liquid distributor type R for assembly through manholes DN 600

▼  
Montz-liquid distributor type R DN 10600 on the distributor test rig

## Montz Liquid distributors are synonymous for

- Distribution uniformity: standard deviations between the individual drip points are only between 3 and 5%
- Number of drip points: From 60 to >250 per  $m^2$  (depending on application and liquid load)
- Liquid loads: depending on the design of the distributor <0.1 to > 250  $m^3/(m^2h)$  (distributors for 20l/( $m^2h$ ) have been successfully applied, e.g. distillation of glycerine)
- Flexibility: standard turn down ratio 1 : 2.5 (higher ratios like e.g. 1 : 10 and more are possible using multi-stage distributors).
- Design know-how for high viscous liquids





- Diameter: distributors for diameters from 70 mm up to 12 meters and more
- The same design principle for diameters from 200 mm to 12 meters and larger
- Liquid feed by pre-distribution system adapted to the respective application
- Contamination: designs which are insensitive to solids and in particular to sedimentable impurities
- Simple adjustability by standard fitter's tools
- Rigid fixing to the column wall
- Assembly and inspection of the liquid distributors through manways for columns from DN 800. In smaller columns assembly is carried out through shell flanges.

#### Quality assurance

Each of the liquid distributors made by Julius Montz is subject to a quality test with water on our own test facility. The following points are being tested and documented:

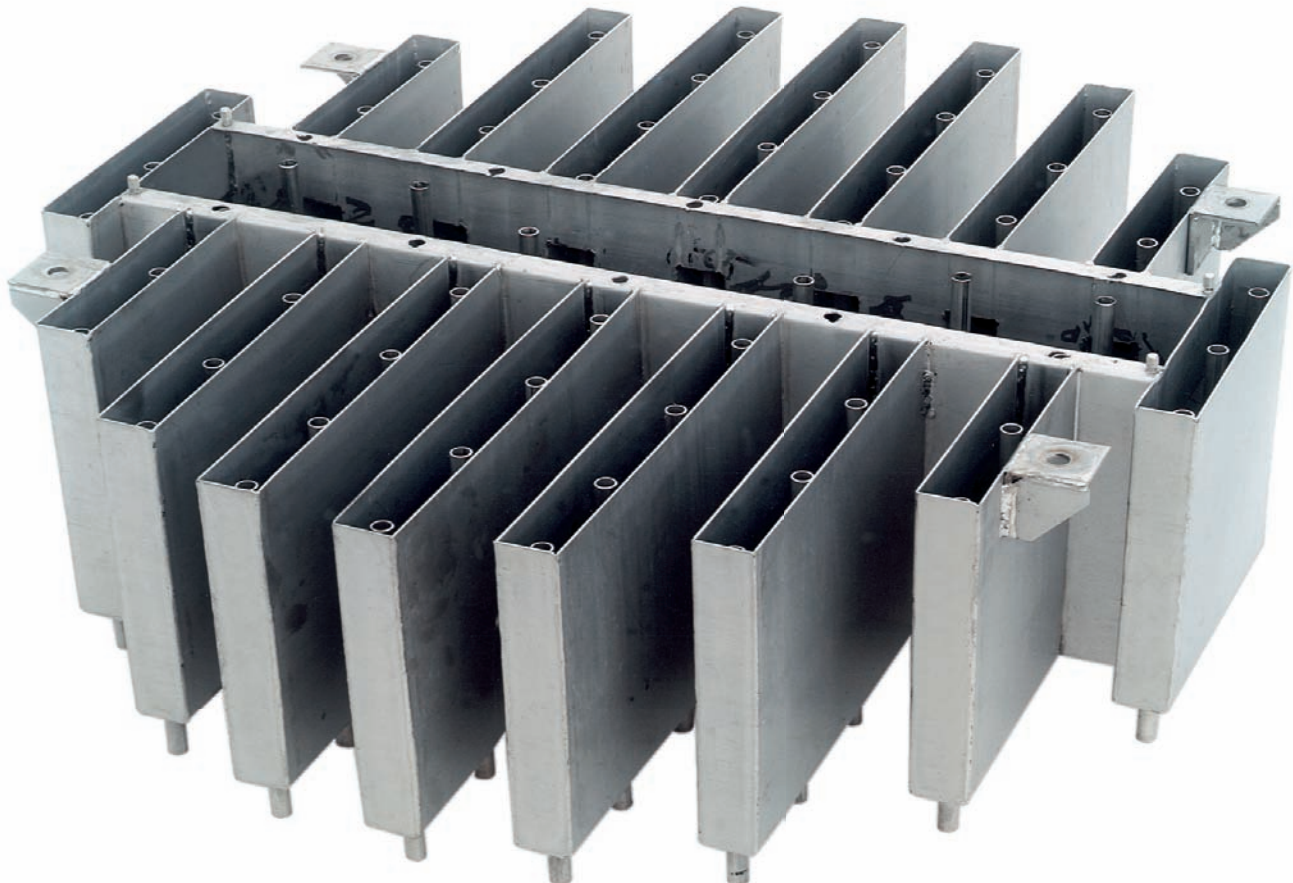
- Quality of manufacture
- Leak test
- Distribution accuracy: the distribution accuracy is determined on the basis of the flow from each drip point
- Throughput and operating range
- Tests are performed in presence of the customers
- For each distributor a test report is compiled and added to the final documentation

Julius Montz has its own test facilities with a size of two to nine meters in diameter in a separate test hall. Distributors over nine meters in diameter are tested on a test rig in the open solely installed for this purpose.

At the test benches there are pumps with a capacity of 2500 m<sup>3</sup>/h of liquid.

The test setup is carried out with the fixing and levelling instruments and elements that are used in the final columns.

▼  
Liquid distributor type R for assembly through shell flanges



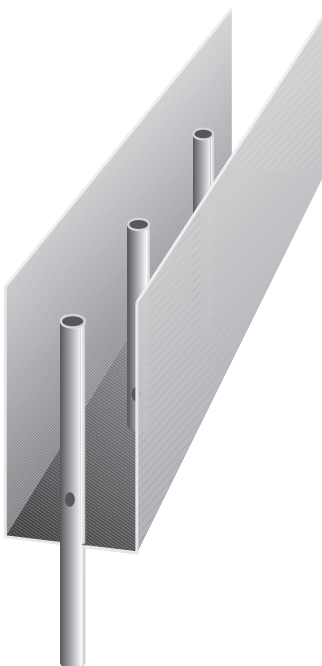
# Liquid distributors Type R and Type N

**Solutions for all kinds of application**

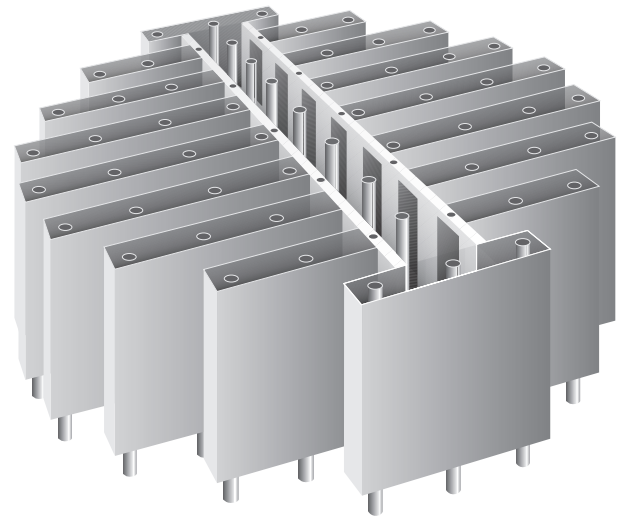
**Montz can offer a comprehensive range of liquid distributors adapted to various fields of application. As a result of many years of research and development, they fulfil the highest quality requirements and ensure an excellent performance.**

## **Channel-type distributor Type R**

- Liquid outlet through drain tubes welded into the channels. Each drain tube has holes through which the liquid flows a few centimetres above the bottom of the channel.
- Multi-stage designs are possible by the arrangement of several holes one above the other



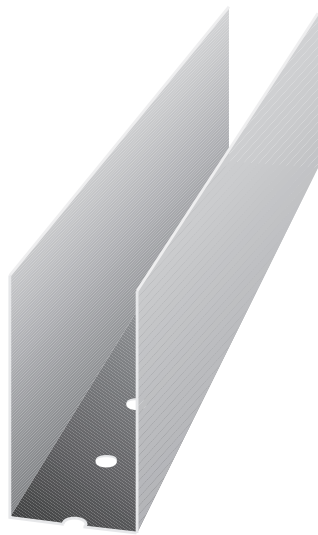
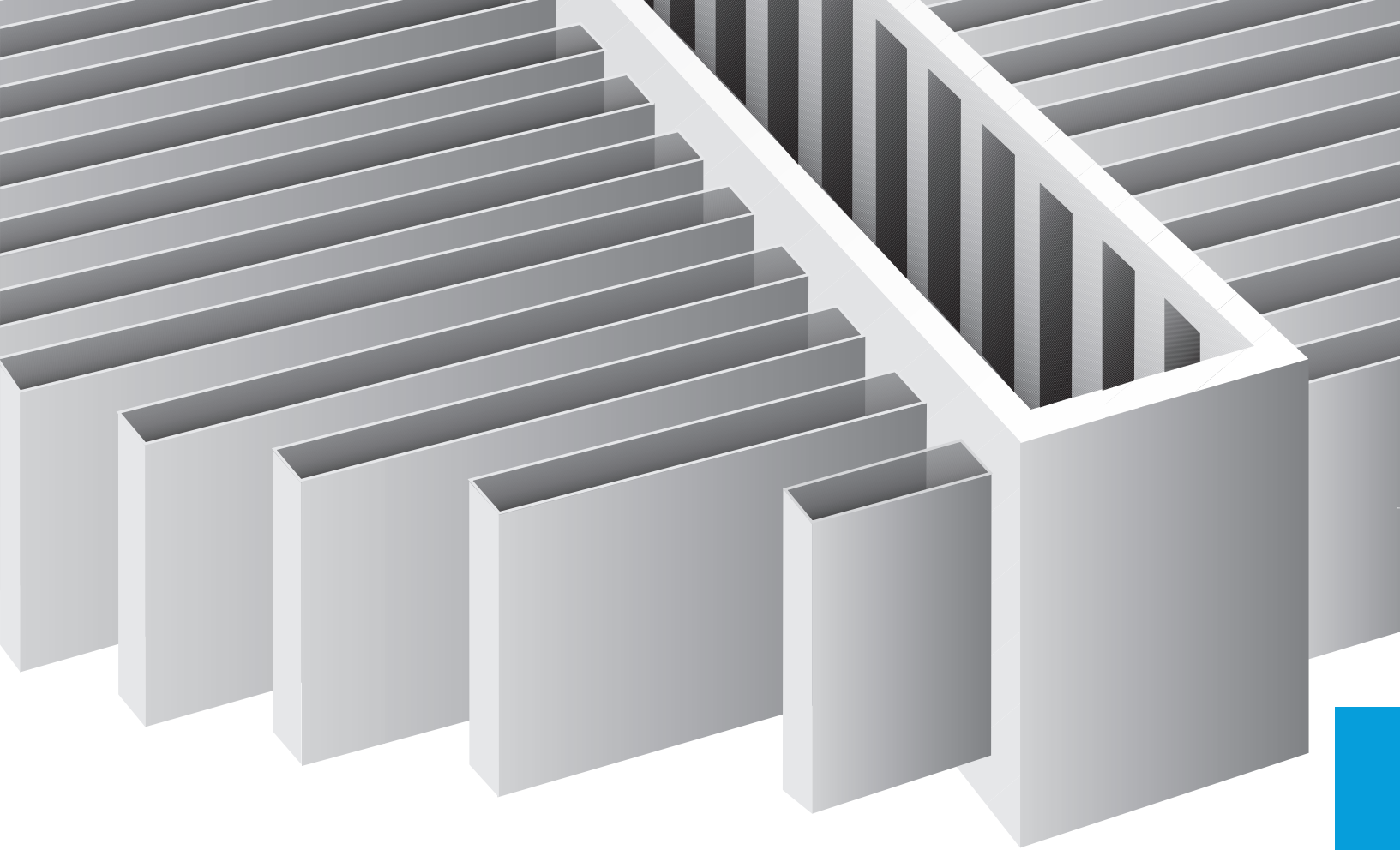
▲  
Detail view type R



▲  
Channel-type distributor Type R

- Operating ranges:
  - 1-stage: approx. 1:2.5
  - 2-stage: approx. 1:10 (higher ranges on request.)
- Number of drip points: 60 to 200 per m<sup>2</sup>
- Throughputs approx. 0.3 to >250 m<sup>3</sup> >/(m<sup>2</sup>h )
- Insensitive to sedimentable dirt particles.

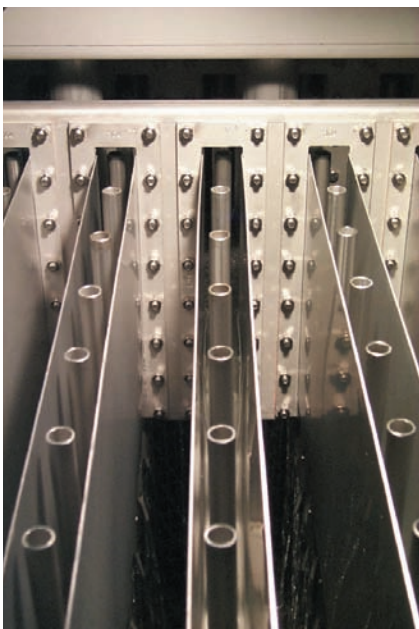




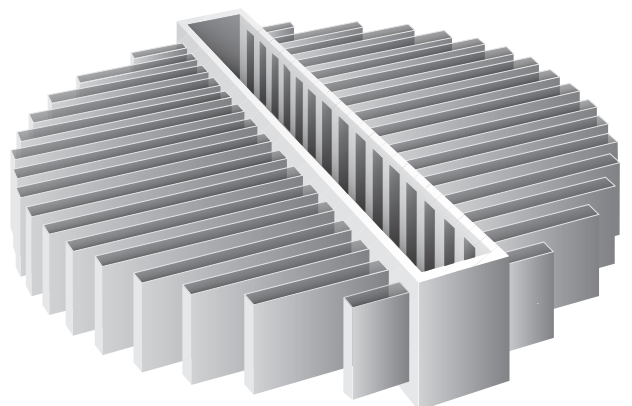
**Channel-type distributor Type N**

- Liquid outlet through holes in the bottom of the channels
- Operating range 1:2.5
- Number of drip points depending on the volume of liquid: 60 to 200 per  $m^2$
- Throughputs approx. 0.3 up to  $>250 m^3/(m^2h)$
- Limited use for liquids containing solids

Detail view channel-type distributor Type R



Detail view Type N



Channel-type distributor Type N

# Liquid distributor Type S

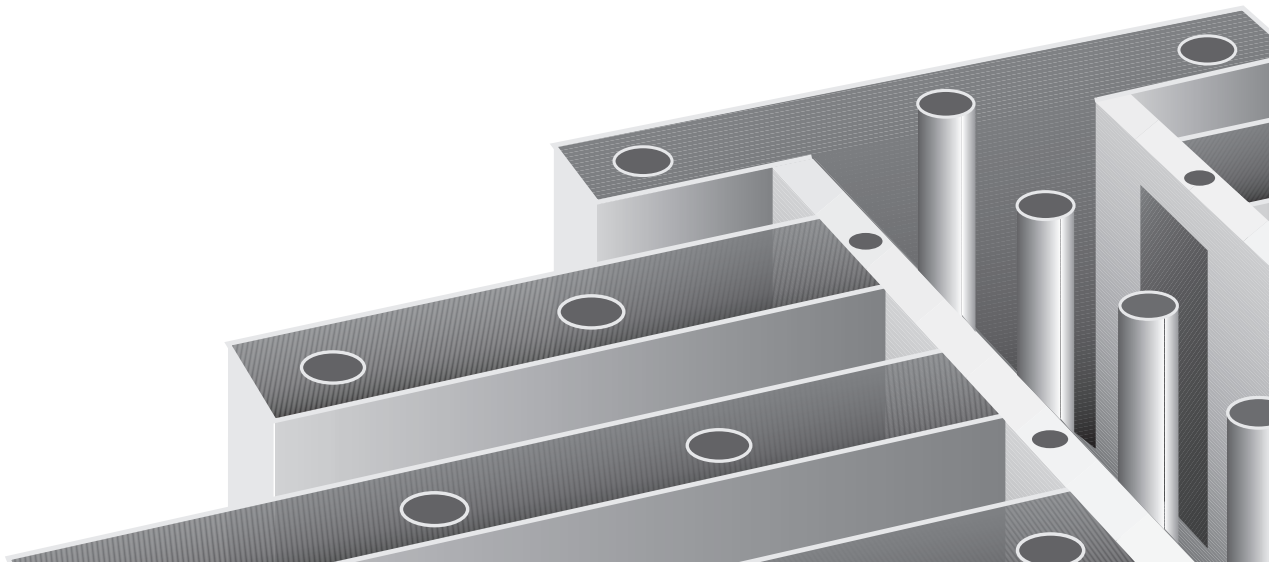
**Solutions for extremely small sprinkling densities**

**The patented liquid distributor Type S is suitable for extremely small sprinkling densities. The special design enables a high density of drip points, so that the packing surface is completely wetted even with small amounts of liquid.**

The basic design of the Montz channel-type liquid distributor Type S is the tried and trusted Montz modular system. The standard drain tubes have additional drainage sleeves so that the liquid flows from each tube is split into a number of small individual flows. The design enables drip point densities of at least 100 per m<sup>2</sup> for even small amounts of liquid.



◀ Detail view Type S

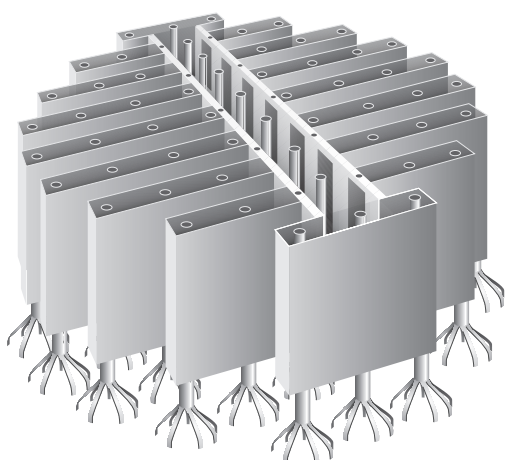






▶  
 Montz liquid distributor Type S  
 with short drip fingers

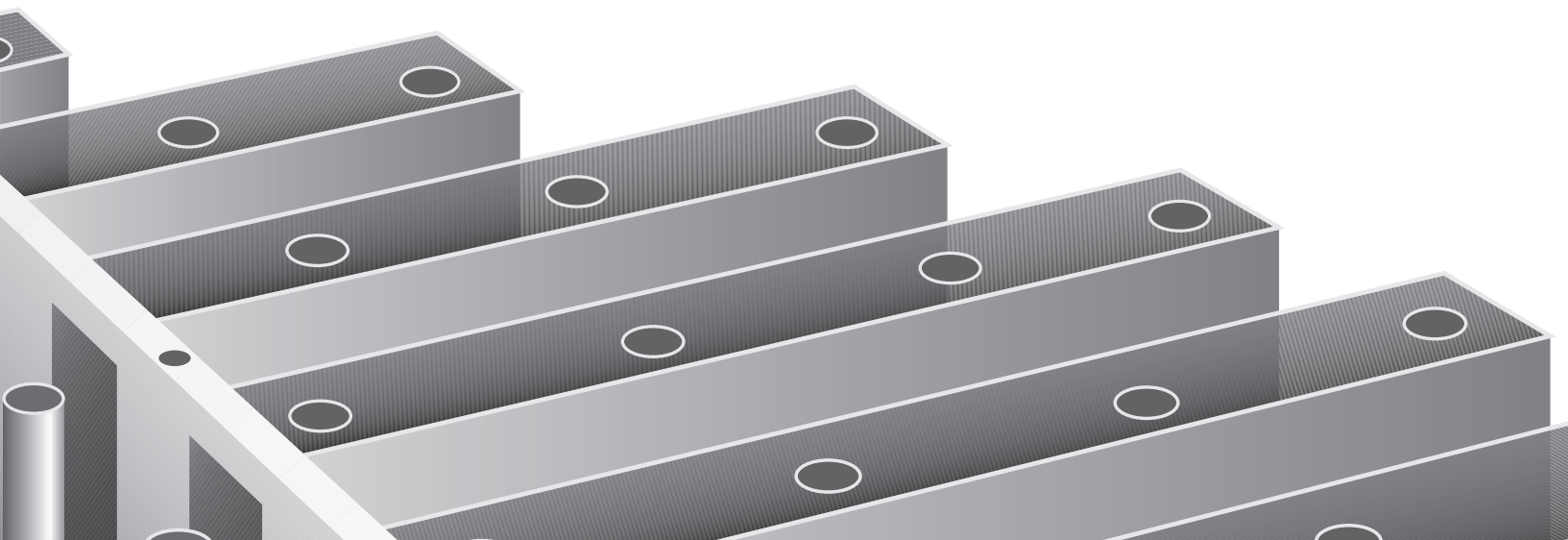
▼  
 Channel-type distributor Type S



**Channel-type distributor Type S**

- Liquid distributor for lowest volumetric flows (smallest flows to date around 20 l/(m<sup>2</sup>h))
- Liquid outlet through drain tubes similar to Type R
- Each drain tube has drainage sleeves with lateral slots and seven or more drip fingers at its lower end to split the liquid flow into corresponding partial flows

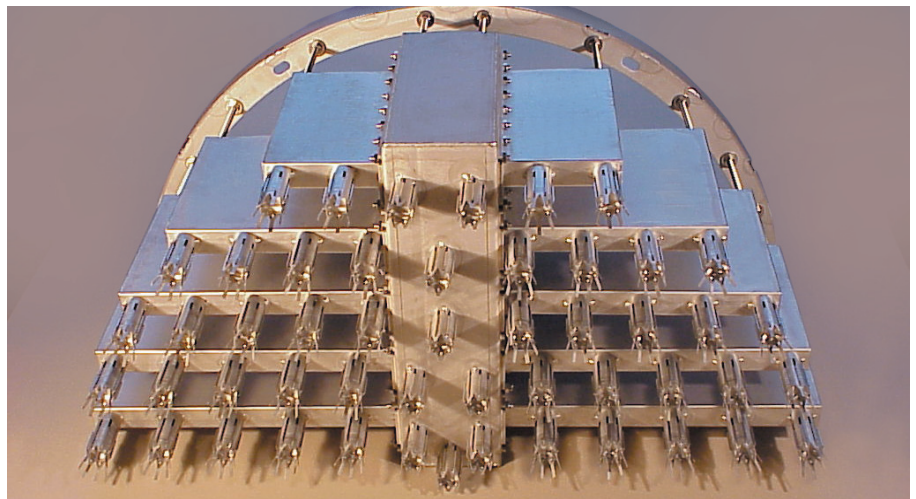
- Operating ranges:  
 1-stage: approx. 1:2.5  
 2-stage: approx. 1:10  
 (higher ranges on request).
- Number of drip points 100 to 1000 per m<sup>2</sup>
- Throughputs 0.02 to approx. 70 m<sup>3</sup>/(m<sup>2</sup>h)
- Insensitive to sedimentable dirt particles



# Liquid distributor Type S

Solutions for the toughest applications

Because of the great demands made by liquid distribution on structured packings, Montz has gained a reputation as a specialist in this field. Special designs tailored to even extreme requirements are standard for us.



▶ Montz liquid distributor Type S for use in a partition column



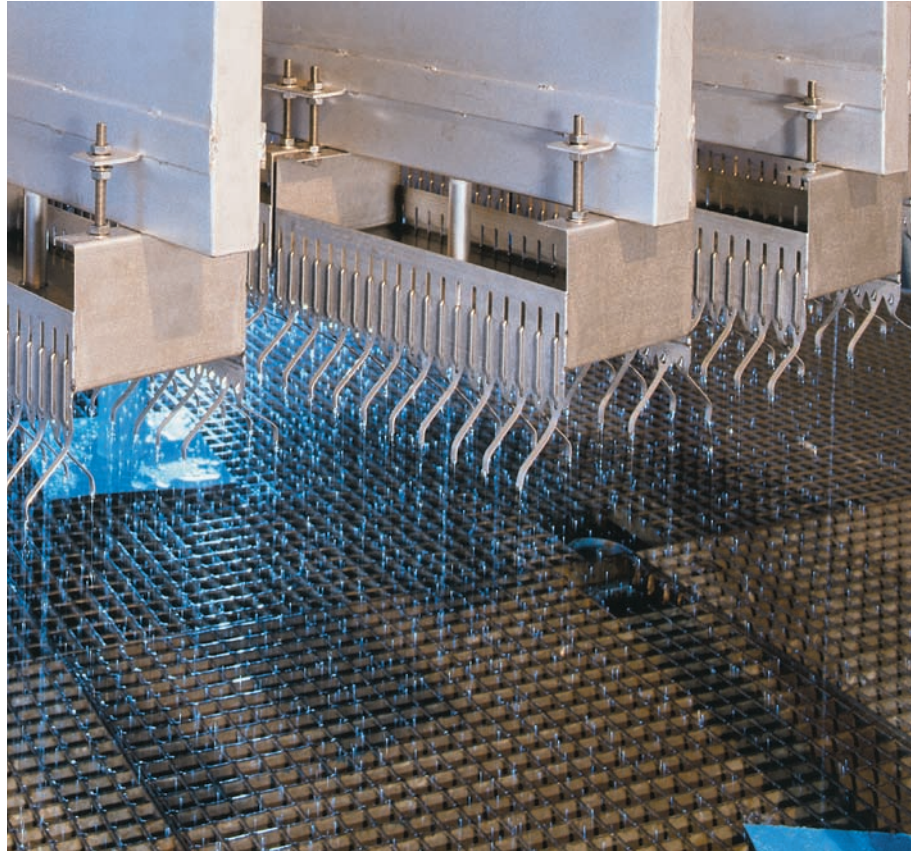
## Special applications

- Non-corrosive materials such as tantalum, zirconium and titanium are almost standard
- Liquid distributor Type S for sprinkling tube bundle reactors filled with catalyst
- Distribution of high-viscosity liquids, for example 1300 mPas

◀ Montz liquid distributor Type S of aluminium, DN 2400 designed for 100 l/(m<sup>2</sup>h) up to 750 l/(m<sup>2</sup>h)



The liquid distributor Type S shown here is one example of a solution to a customer's problem for distributing small volumes of liquid



► Special design of the Montz liquid distributor Type S for the lowest liquid sprinkling densities



► Drip pattern of a Montz liquid distributor Type S (special design)

# Liquid distributors

## Montz combination distributors and pipe distributors

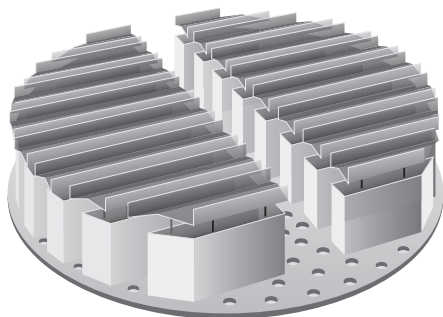
**Combination distributors serve as liquid collectors and distributors. Chimneys with covers enable the passage of rising vapour and the collection of the liquid at the same time. The packings are then fed with the liquid through holes or drip tubes.**

### Montz-Combination Distributor

#### Combination Distributor

##### Type KN

- Holes in the bottom plate beside and between the risers uniformly distribute the liquid across the packings arranged underneath
- Assembly through manways
- Operating range approx. 1 : 2.5
- Number of drip points: approx. 60 to 100 per m<sup>2</sup>
- Throughput approx. 1.0 to > 250 m<sup>3</sup>/(m<sup>2</sup>h)
- Relatively insensitive to solids

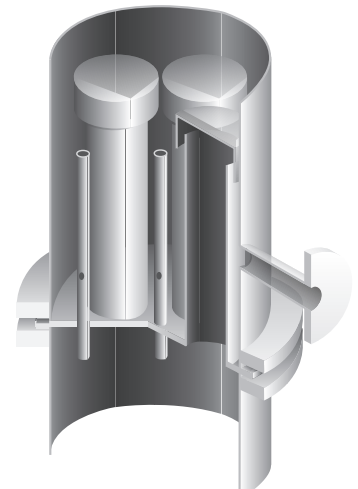


Combination Distributor Type KN

#### Combination Distributor

##### Type KR

- Instead of holes drain tubes are used in this case
- Operating range 1-stage: approx. 1 : 2.5, 2-stage: approx. 1 : 5
- All other characteristics as for Type KN



Combination Distributor Type KFR

#### Combination Distributor Type KFR

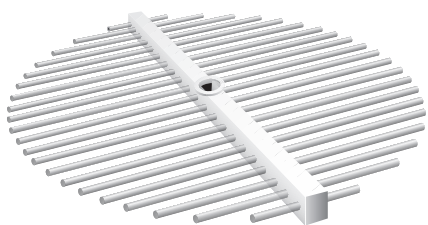
- For small column diameters for the installation between flanges
- Liquid flow through drain tubes
- Operating range:  
1-stage 1 : 2.5  
2-stage: approx. 1 : 5
- Throughput approx. 1.0 to > 250 m<sup>3</sup>/(m<sup>2</sup>h)





### Pipe Distributor Type RO

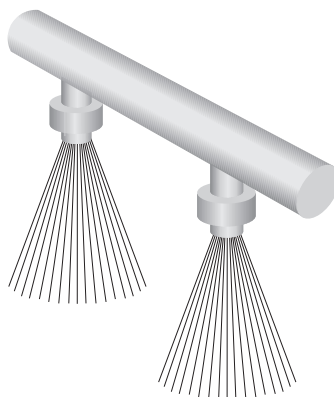
- Outlet through holes on the underside
- Operating range approx. 1:2.5 (higher ranges on request)
- Number of drip points: approx. 60 to 100 per m<sup>2</sup>
- Throughputs approx. 1 to 250 m<sup>3</sup>/(m<sup>2</sup>h)



▲ Pipe Distributor Type RO

### Pipe Distributor Type ROD

Same design as Type RO but full cone spray nozzles instead of holes for the distribution of the liquid



▲ Pipe Distributor Type ROD

### Montz-Pipe Distributors

**The tubular distributors consist of a centrally arranged main tube with secondary tubes laterally arranged at right angle. The liquid is fed into the main tube. The distributor is fixed at a support inside the column. Each of the lateral tubes is exactly adjustable. Assembly is carried out through manholes or via shell flanges.**

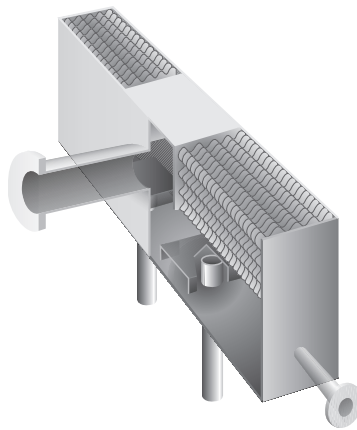
# Column internals

## System accessories for Montz packings

The range of products offered by Montz is rounded off by special internals. A perfect performance can thus be achieved with a fully integrated program.

### Flash-Boxes

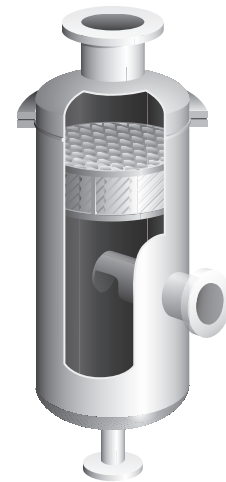
Flash-Boxes are always installed at a column feeding point when the inlet is overheated. Flash vapour may thus occur after entrance into the column, which can affect the good functioning of the liquid distributor.



#### Flash-Box TYP IN

Flash-box type IN has been designed for smaller amounts of flash vapour occurring at overheated inlets. This type of flash-box can be installed inside the column near the inlet.

Flash-box type IN is suitable for columns with a diameter from approx. 900 mm.



#### Flash-Box Type A

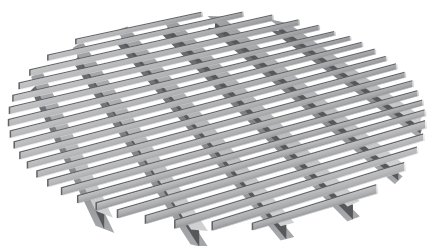
Flash-box type A has been designed for higher evaporation rates. It is installed outside the column near the column feeding point: the overheated feed enters the box via a nozzle and is reduced to column pressure inside the box. The flash vapour generated escapes through an mist eliminator on top of the flash-box and is fed to the column through a piping system. The residual liquid is drained from the bottom of the box and flows to the feed nozzle of the column.





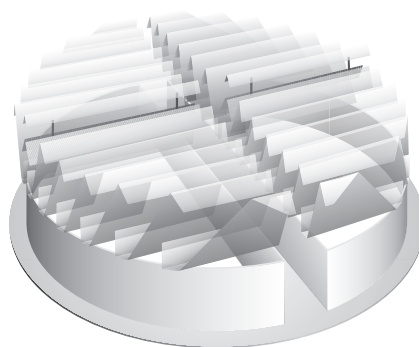
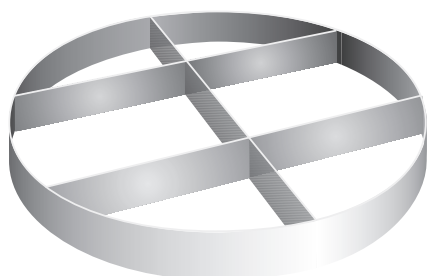
### Support System Type G

Support systems serve as support for the structured packings. The support system Type G is suitable for columns of a diameter of >1000 mm. Two or more beams bridge the cross-section of the column. These main beams hold the grate rods onto which the packing is placed. It is designed so that all parts can be installed through manholes.



### Support System Type K

The support system Type K for columns of a diameter of <1000 mm is of a one-piece design and is installed in the column through a shell-flange connection. For diameters up to approx. 2500 mm the support system is of multisectional design and is installed through manholes. Cams on the column wall serve as a support and for fixation.



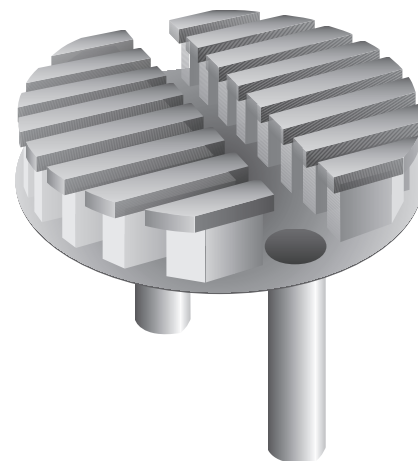
### Vapour Distributors

Gas or steam distributors are used to achieve a uniform inflow across the whole cross-section of the column. The use of vapour distributors is recommended in the case of low vapour velocities and if the vapour nozzle beneath the packing is too narrow.

### Liquid Collector

Liquid collector trays are arranged between two packing sections. Thus, the liquid trickling down is collected by the liquid collector tray and from here it can be returned to a liquid distributor.

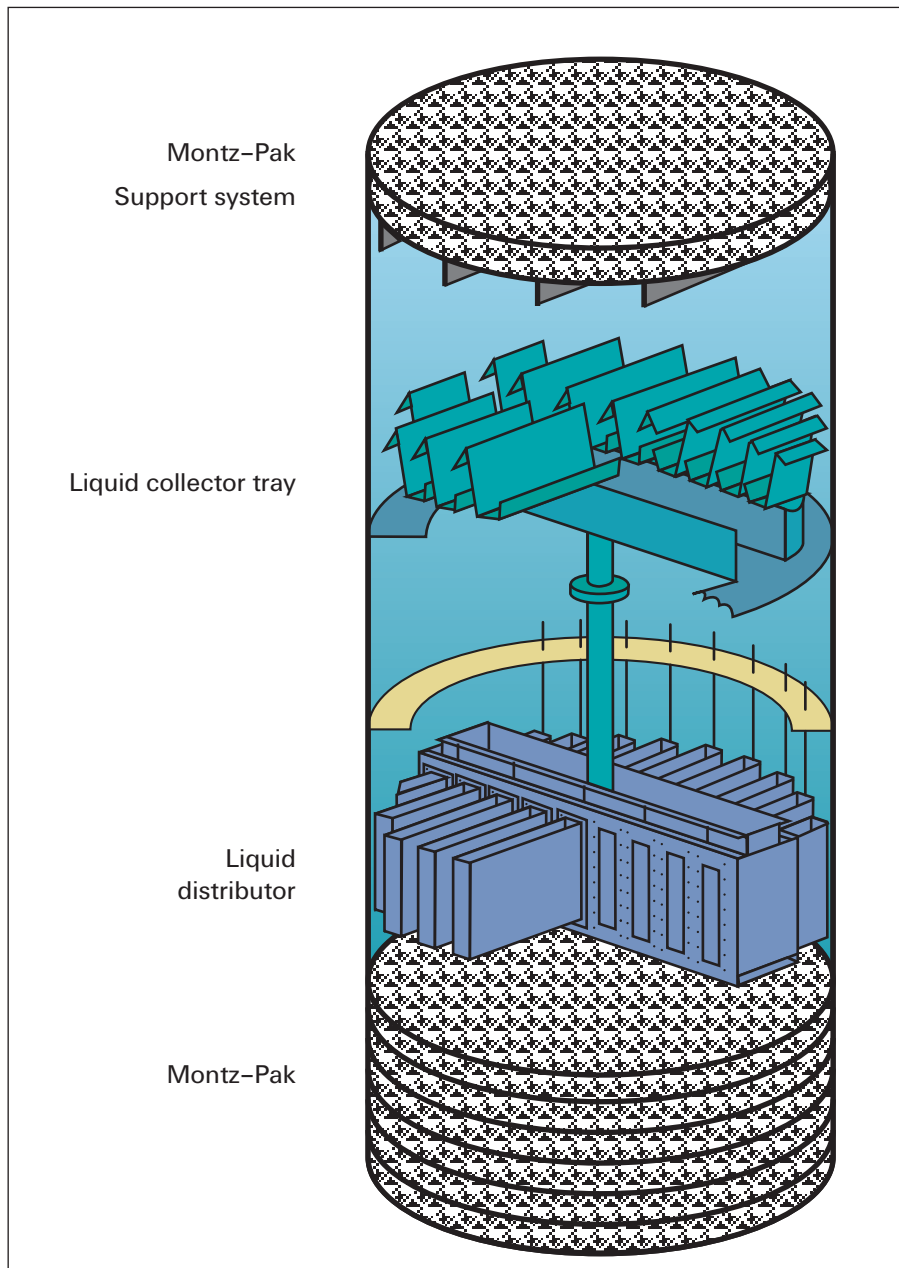
In the area of the liquid collector tray it is possible to install liquid/vapour feeds or liquid/vapour draw offs.



# Column Arrangement

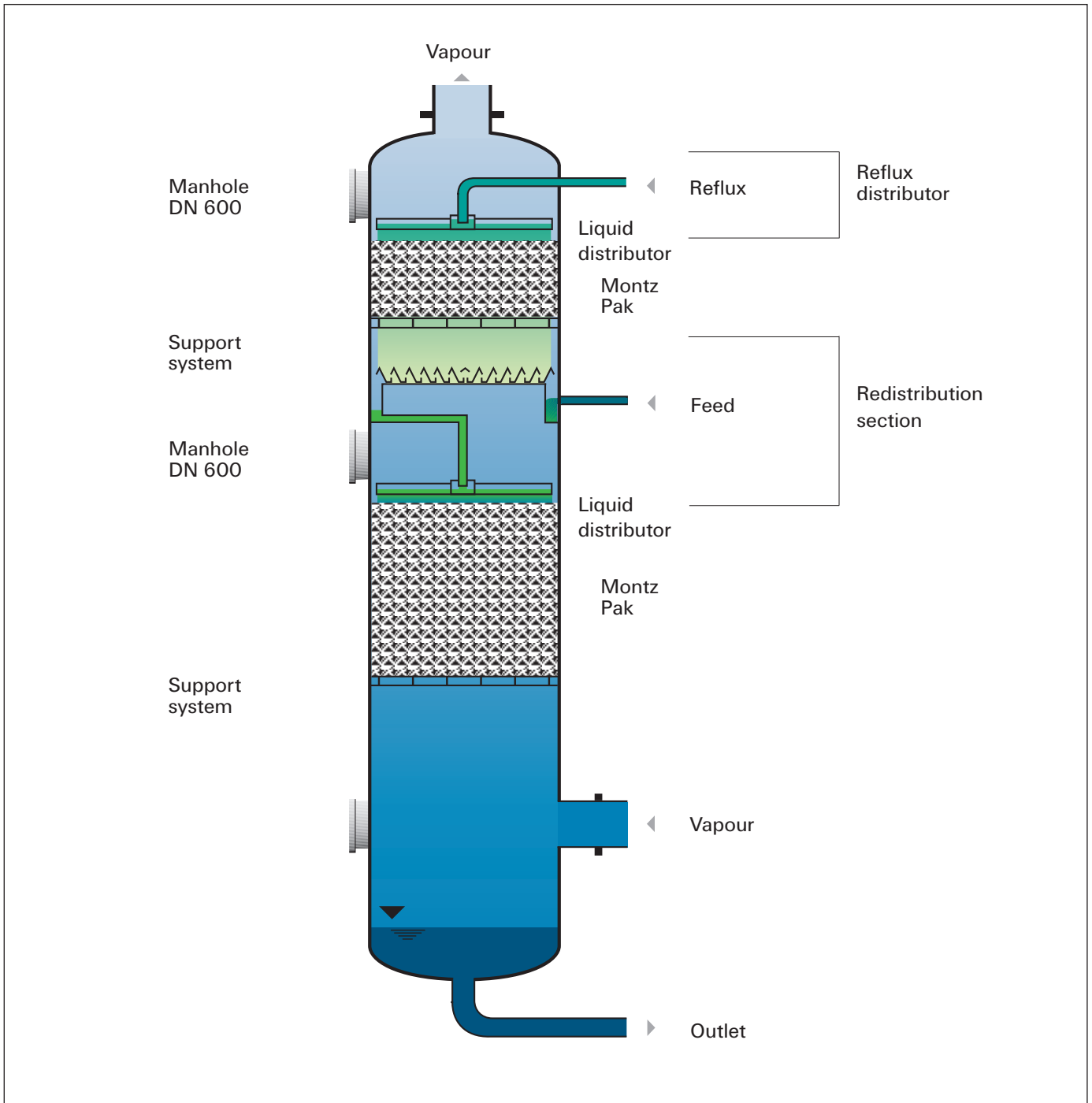
A cross section through the design system

The structural design of a column is illustrated by the following cross-section drawings. They will give you an idea of a sensible configuration of Montz products in a column.

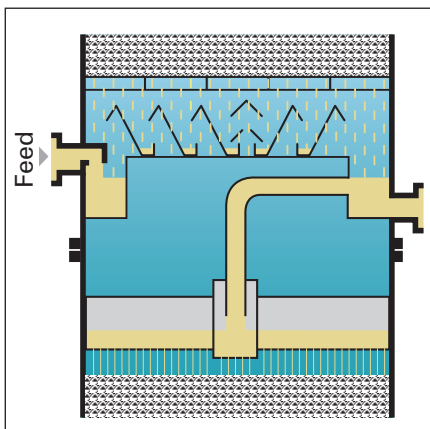


◀ Redistributing section for column diameters of 800 mm and larger

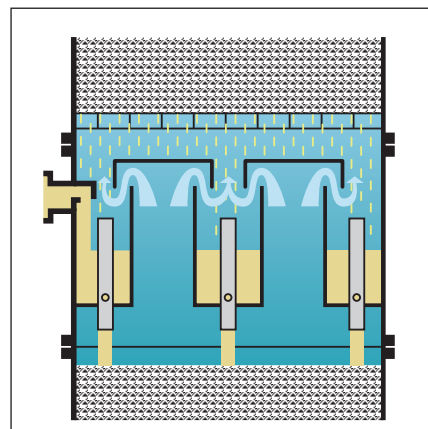




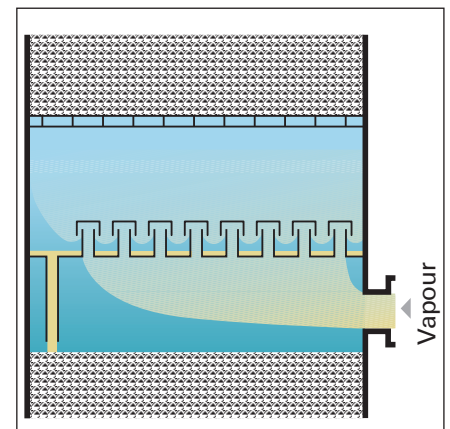
Redistribution section for column diameters < 800 mm



Combination distributor Type KF welded into a column section for intermediate flanging, for diameters < 800 mm



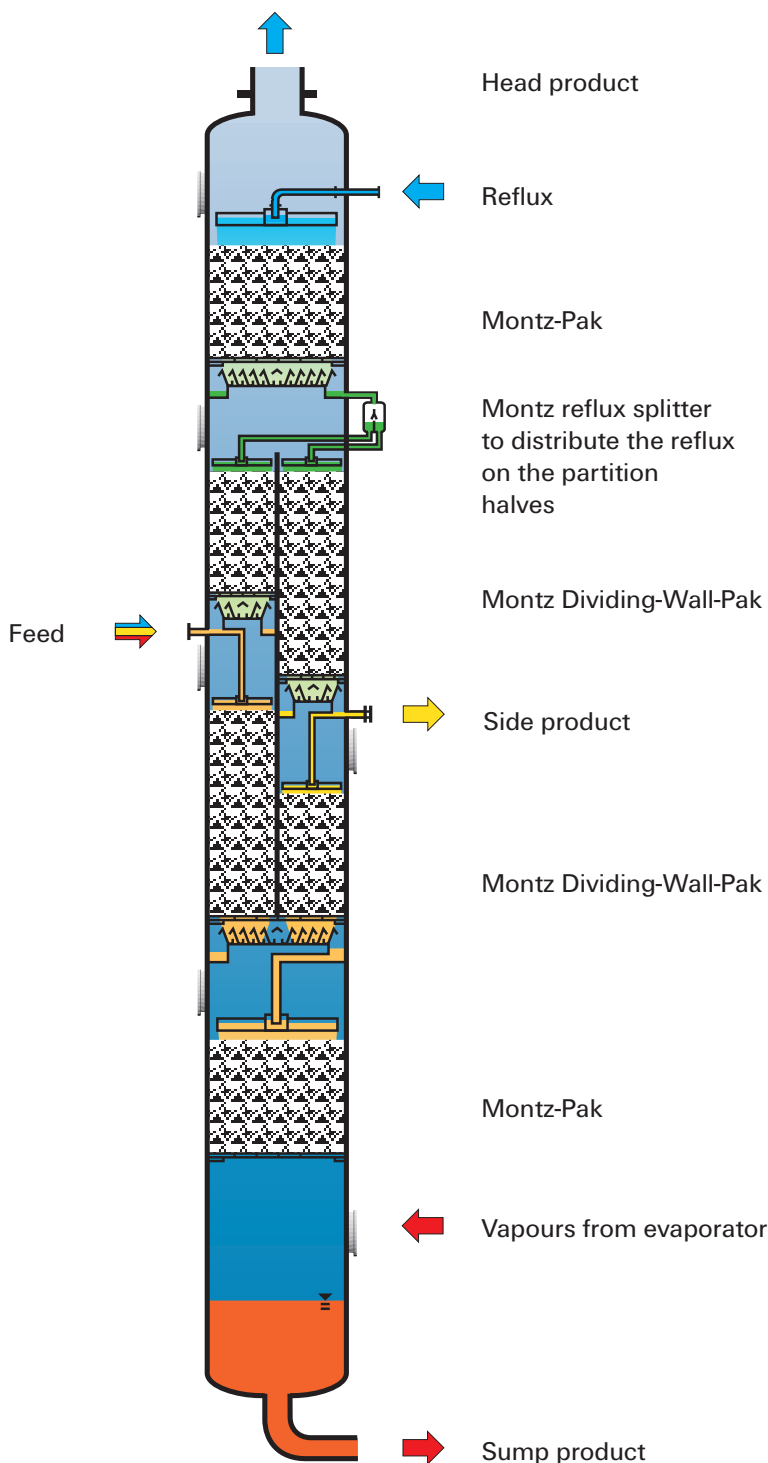
Vapour distribution



# Montz dividing wall columns

## Separation technology takes off

**Dividing wall columns have been in use in production of chemical industry for the past 18 years. Montz were the first to supply columns of this type and since then have constantly championed the development of this technology. With over 90 dividing wall columns, Montz is the world's leading equipment supplier for this column system.**



### Dividing wall columns

Dividing wall columns can be used wherever multicomponent mixtures have to be separated into pure fractions. They are particularly suited to obtain pure medium boiling fractions. The separation of a three-component mixture into its pure fractions in conventional systems requires a sequential system with at least two columns or main columns with side columns. With a dividing wall column this task can be solved in only one apparatus.

A vertical wall is introduced in the middle part of the column, creating a feed and draw-off section in this part of the column. The dividing wall, which is designed to be gas and liquid-sealed, permits the low-energy separation of the low and high boiling fractions in the feed section. The medium boiling fraction is concentrated in the draw-off part of the dividing wall column.

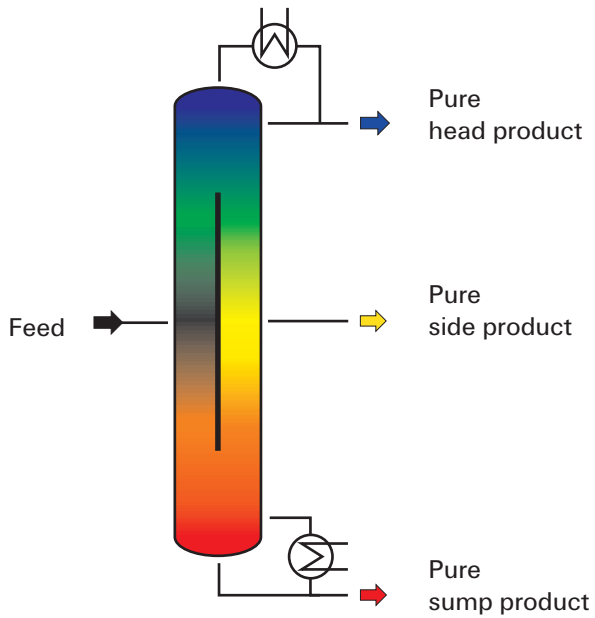
This arrangement saves a second column. The column shell, internals, evaporator and condenser for a second column are not needed. Control and maintenance work is significantly reduced.

Dividing wall columns are an alternative to multi-column systems that can help to save investment and operating costs. Investment costs are cut by 20 - 30%, operating costs by around 25%.



## Comparison of two column systems for three pure products

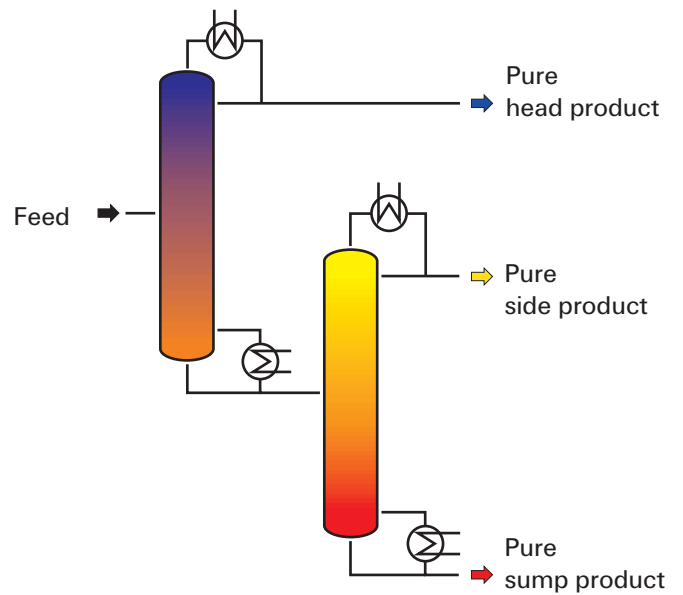
### ▶ Dividing wall column



Equipment needed

- ▶ One column
- ▶ One condenser
- ▶ One evaporator
- ▶ One reflux splitter

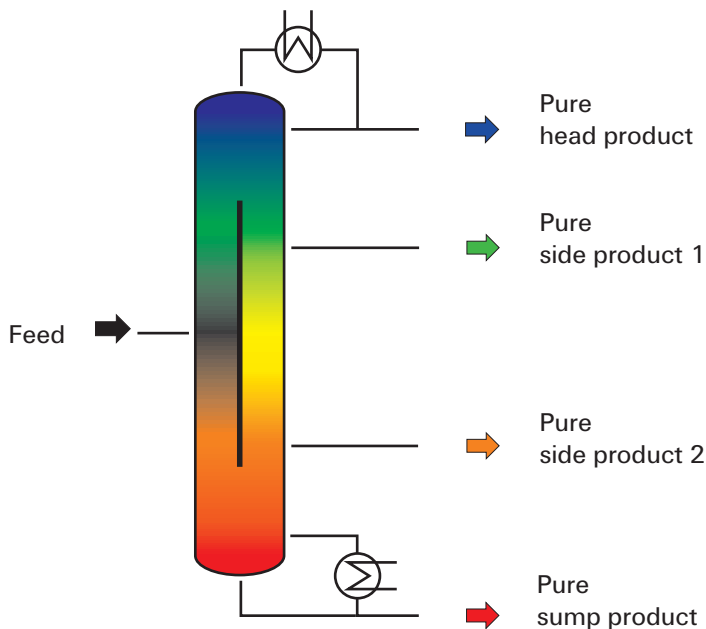
### ▶ Conventional column system



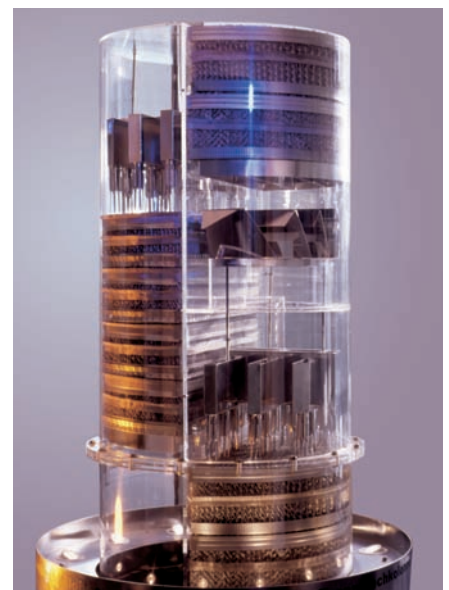
Equipment needed

- ▶ Two columns
- ▶ Two condensers
- ▶ Two evaporators

### ▶ 4-component mixtures can also be separated into pure fractions in a single dividing wall column.



### ▶ Design of a redistribution section in the dividing wall section DN800



# Dividing wall columns

## Separation technology takes off

**The unfixed dividing wall has proven to be very advantageous and versatile when used in dividing wall columns. The patented design (cooperation agreement with BASF AG) offers significant advantages over fixed, welded-in walls.**



### Advantages of the unfixed dividing wall

- Insensitive to poor manufacturing tolerances of the column shell
- Fewer manholes and lower weight
- Faster and more precise assembly and installation of internals
- Minimised welding
- Simple and low-cost revamping of conventional columns to dividing wall technology
- The dividing wall can be removed during revamping and inspections

Possible problems such as eccentric arrangement of the dividing wall during welding, irregularities in the wall after welding, liquid wall bypass and installation difficulties, are avoided.

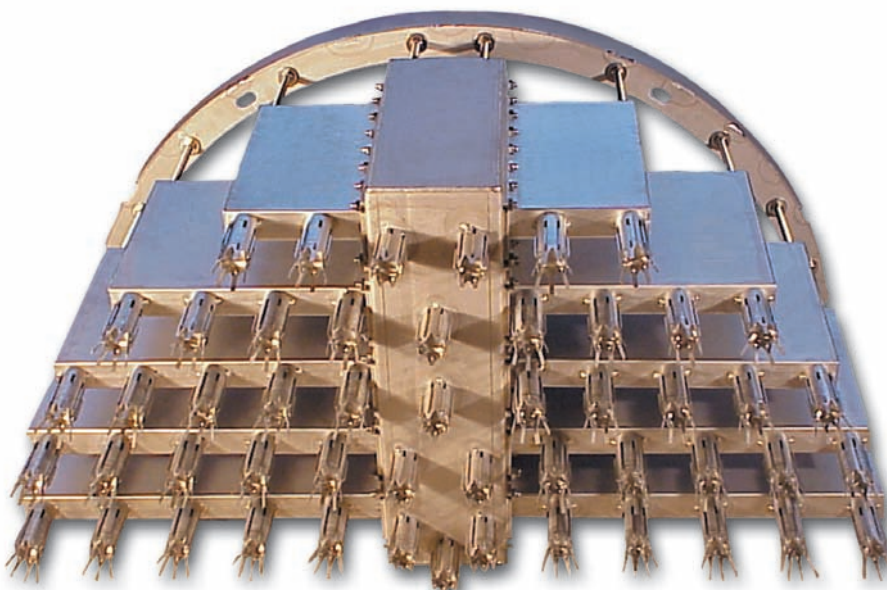
### Internals for the dividing wall column

Montz have significantly improved the planning and operational reliability of the columns, particularly in the field of the internals for the dividing wall sections, by adapting the proven

delivery program of structured packings over the past years. Thus, all Montz packings have a patented wall wiper system that offer a self-adjusting and centering of the

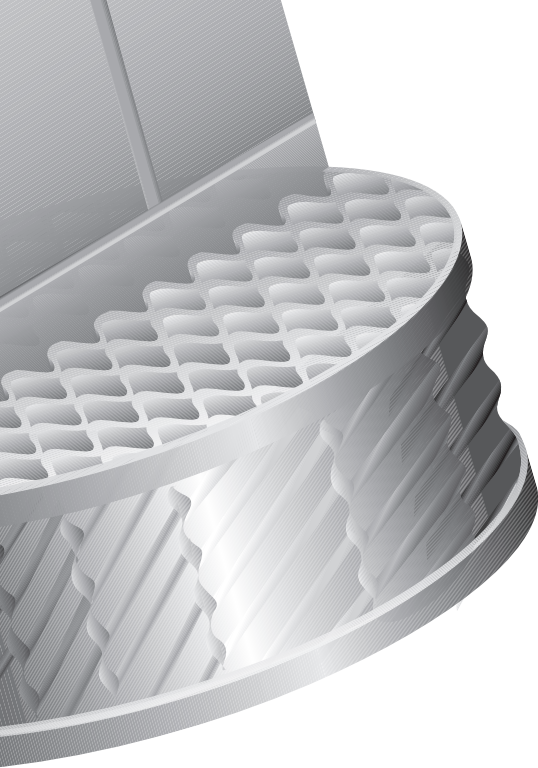
packing layers, minimised liquid wall bypass and thus an improved separation efficiency in conjunction with the unfixed dividing wall.

Wire mesh packings of the type A3-500 and metal sheet packings in a standard design as well as Type M high-performance packings are in successful operation. Adapted liquid collection and distribution systems completes off the range of internals.



◀ Type S liquid distributor for dividing wall columns





▲  
Montz wall wiper system and Montz connector system for unfixed dividing wall

**Competence**

The dividing wall column concept is used as a standard tool in today's thermal separation technology. Dividing wall columns are successfully in use in the field of fine vacuum through to pressured distillation. Working head pressures of 2 mbara to 10 bara have been successfully realised. Pilot column diameters are around 40 mm with overall heights of 6 meters and more, whereas pro-



Montz process engineering provides all the necessary expertise in this innovative technology and is therefore able to support you when designing your dividing wall column or just components, and is also able to do the planning of the complete distillation systems.



**Control**

The correct operation of dividing wall columns requires a control of the liquid distribution ratio between the halves of the dividing wall. Montz reflux splitters offer the necessary flexibility and operational reliability, enable small overall heights and work much more precisely than valve and orifice plate control systems.

duction columns are built with diameters of 4 m and heights of 70 meters. Dividing wall columns are used to distil various product classes, from recycle stream purity requirements through to electronic-grade chemicals.

▼  
Dividing wall column DN 3600



# Montz Miniplant Columns

## Safe scale-up

**Pilot tests are an important step in developing processes. Montz can therefore supply not only internals but also complete small-scale columns and miniplant systems. Distillation systems from Montz vendor guarantee a safe scale-up from the small-scale to industrial plants.**



In the chemical and refining industry the setup of pilot and miniplant columns is a necessary step to ensure safe column sizing by measuring or approving equilibrium data in process simulation.

Depending on the kind of project either complete small-scale miniplant column systems with a diameter of 20 to 300 mm and an approx. height of 3 to 10 m are built. The test columns are like their larger counterparts and can consist of components like column bodies, reboilers, condensers and final-condensers. Possible are also gas coolers, vessels, decanters and reflux splitters. Materials can be from stainless steel to enamelled steel. Furthermore, if desired those Pilot columns can be delivered skid-mounted.

Of course Montz uses their structured packings in the pilot plants. These achieve a uniform, high separation efficiency at a low pressure drop and allow a safe scale-up into the planning of the actual production plant.

◀  
Miniplant column partition DN 40  
with Montz-Pak A3-1000





◀  
 Montz packing element for  
 Miniplant column DN 40

Alternatively pilot distillation tray constructions are being used. These are especially built for settling and 2-phase systems or can be of use in reaction columns with longer residence times. If the freedom to choose the feed and side draw-off tray location is necessary while carrying out the distillation tests, trays the choice to be made.

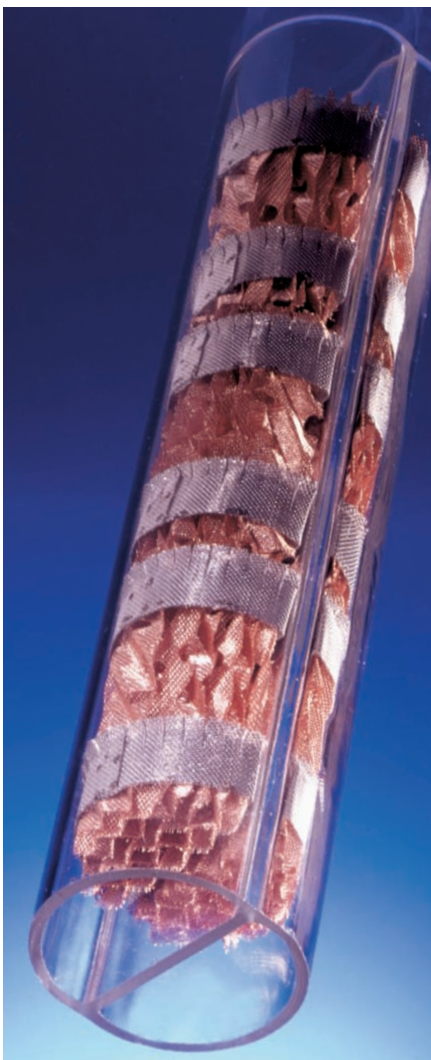


▲  
 Bubble cap tray DN 100  
 with Teflon seal

Here, Montz can offer constructive solutions for mass transfer trays from a column diameter starting at 40 mm.

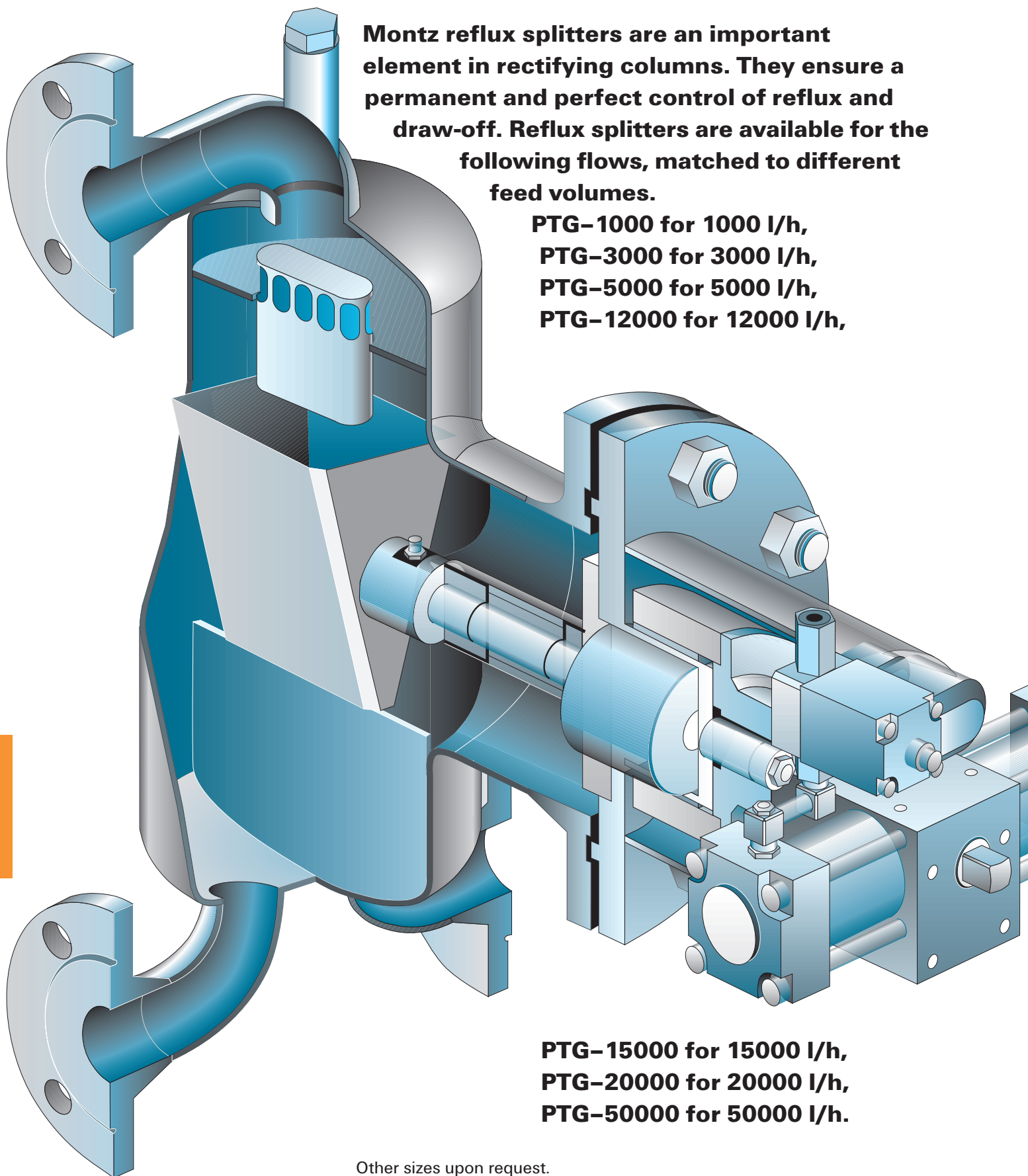
The internals can be subject of a functional test with air-water before delivery. Also, if preferred these tests can be conducted in your presence.

▶  
 Miniplant column DN 100 of  
 stainless steel with bubble cap trays



# Reflux splitter

**Constant reflux ratio under any  
and all operating conditions**



**Montz reflux splitters are an important element in rectifying columns. They ensure a permanent and perfect control of reflux and draw-off. Reflux splitters are available for the following flows, matched to different feed volumes.**

**PTG-1000 for 1000 l/h,  
PTG-3000 for 3000 l/h,  
PTG-5000 for 5000 l/h,  
PTG-12000 for 12000 l/h,**

**PTG-15000 for 15000 l/h,  
PTG-20000 for 20000 l/h,  
PTG-50000 for 50000 l/h.**

Other sizes upon request.

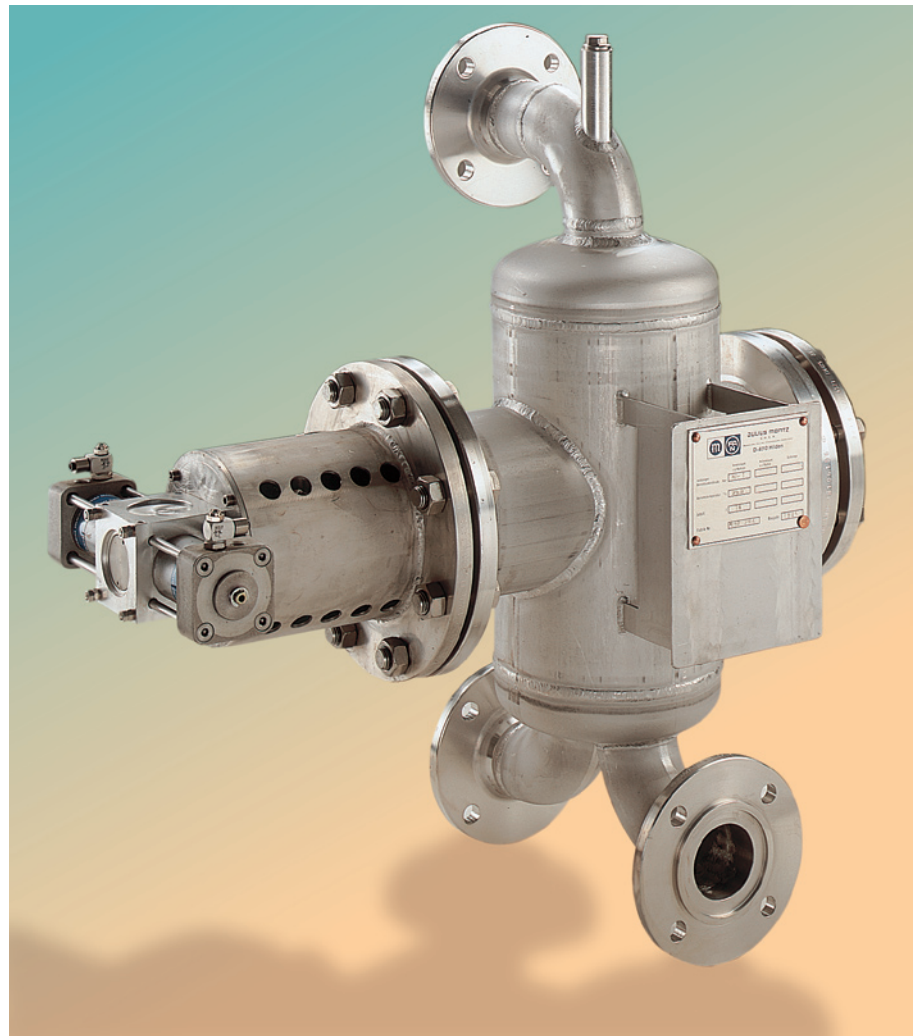
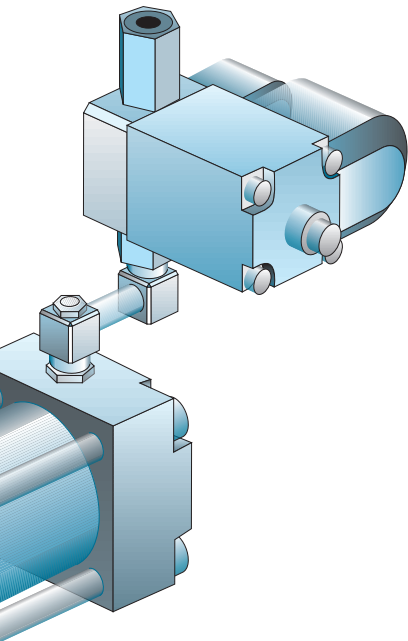


Reflux splitters operate according to the following principle: they consist of a casing which is subdivided into three chambers. The feed chamber is located at the top, from where the liquid is directed into the reflux or pass-out chamber depending on the position of the dividing body. The dividing body is actuated by means of a magnetic coupling which allows a pressure and vacuum-tight design. The exterior drive is effected by a pneumatic rotary motor.

All parts which make contact with the product are made of or lined with corrosion-proof materials to ensure a consistent high quality even with a longer period of operation.

**Special designs**

- Parts in contact with the products of tantalum, zirconium, etc.,
- Casing of steel/enamel
- Heated casing



# Mass transfer trays

Leading position by patented developments

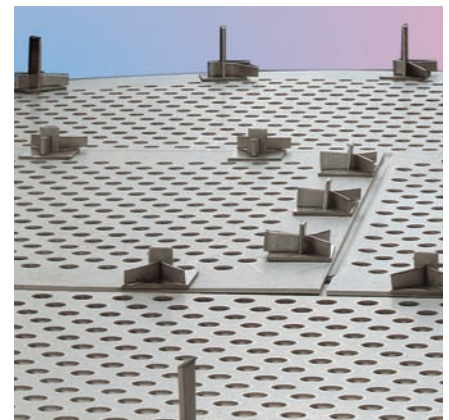
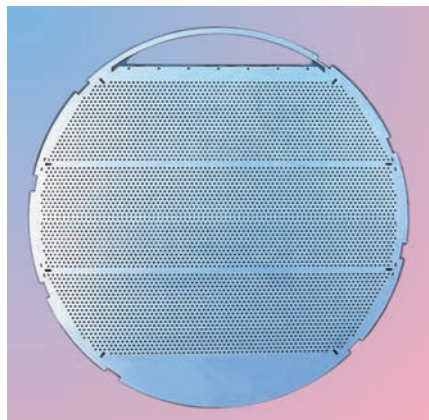


**Mass transfer trays made by Montz play an essential part in thermal fractionating technology in chemistry and related industries. Experience gathered through many years and a steady development led to patent-ed tray designs which have made Montz a leading manufacturer of trays. Apart from a comprehensive standard range of products, Montz also prove their efficiency by custom-ised designs adapted to the special requirements of the customers.**

◀ Montz Thormann® Trays with cooling coils for a reaction column

▼ Montz split-wedge connectors to fasten the tray parts at the support rings and beams. Montz split-wedge connectors have proven their worth under operating conditions with heavy fouling and polymerisations.

▶ Dual-Flow-Trays produced by CNC-controlled nibbling and punching machines.





The well-known range of Montz trays which plays an essential part in thermal fractionating technology consists of the following patented types of trays:

- Thormann® Trays
- Tunnel Trays
- KSG-Trays.

All trays will be presented in detail on the following pages. The program is completed by:

- Bubble cap trays
- Sieve plate trays
- Dual-flow trays
- Cascade trays

A speciality offered by Montz are special designs exactly adapted to the prevailing problems in fractionating.

These primarily include:

- Hold-up time trays with high liquid capacity
- Trays featuring an extremely low entrainment
- Trays with cooling or heating coils

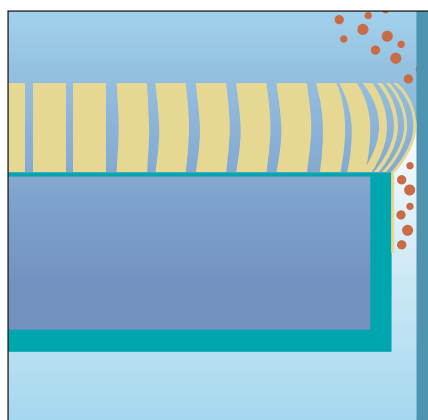
All of the Montz trays are subject to a quality control performed on our own air-water test equipment. It is of decisive importance to check and optimise the function, particularly in case of special designs. This is why Montz can guarantee top quality and efficiency for the conventional range of trays as well as for special developments.



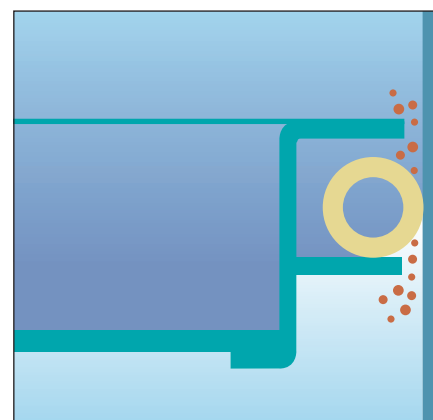
▲ Tunnel trays designed as a plate stack for insertion into the column. Sealing between tray and column wall is effected by means of a coil spring which has been inserted into a circumferential groove.

**Montz sealing for one-piece trays which are installed through shell flanges. These sealings prevent liquid from dripping through the gap between tray and column wall.**

▼ Lip-folded tape as tray sealing



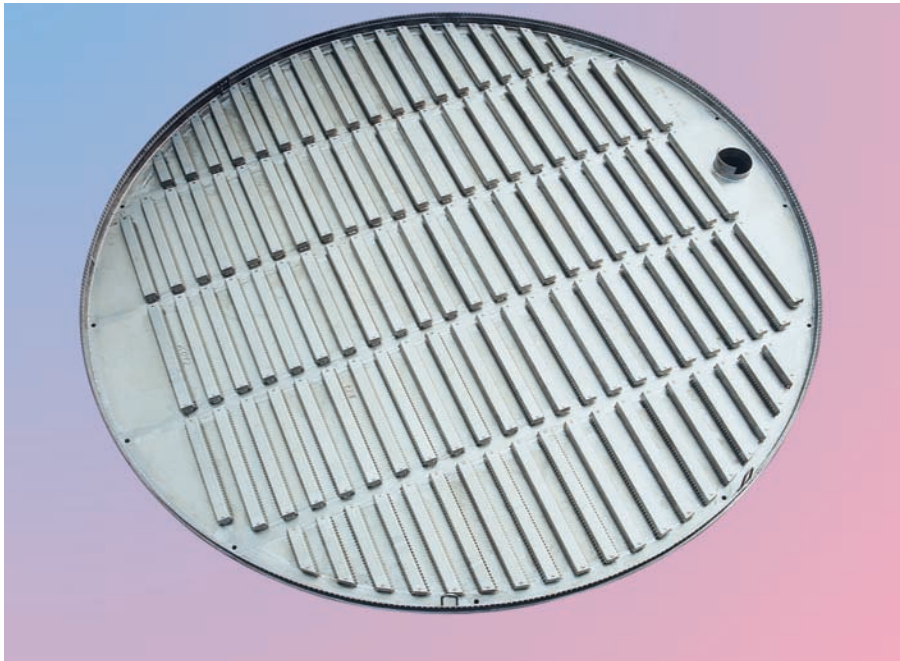
▼ Coil spring as tray sealing



# Montz-Thormann® Tray

**Washing processes and vacuum distillation  
for low flows of liquids**

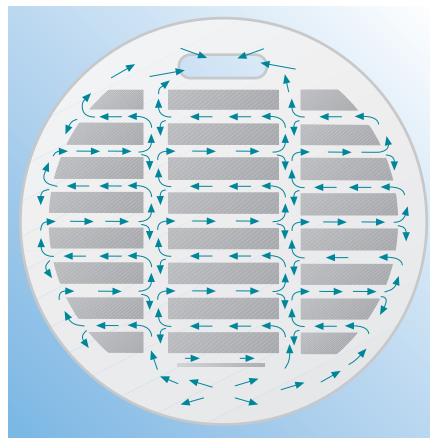
**The Thormann® tray has been designed as a  
tray for washing processes and vacuum distillation.  
It handles even the lowest liquid flows, e.g. 40 l/(m<sup>2</sup>h )  
with a simultaneous small pressure drop of  
approximately 1 mbar per tray.**



▲ Thormann® tray DN 3400 mm, one piece, made of titanium. This tray is of a leakproof design and is intended for use in an HCl-absorption column made of GRP.



▲ Thormann® caps with the characteristic vapour slots for a controlled vapour flow into the liquid.



◀ The arrangement of the caps combined with the special vapour slots ensures a controlled flow of the liquid on the tray and consequently a favourable hold-up time and a high separation efficiency.



### Features

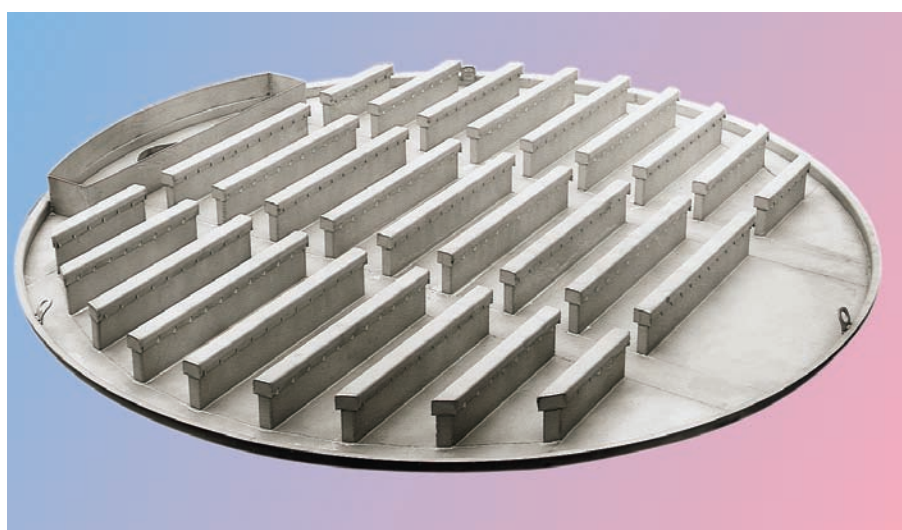
- Suitable for low liquid loads (approx. 40 l/(m<sup>2</sup>h))
- No trickling down of the liquid
- Extremely low pressure drop approx. 1 mbar per tray (are possible)
- Extremely high tray efficiency
- High flexibility
- Leakproof tray design (e.g. for washing processes)
- Customised designs for special applications

### Applications

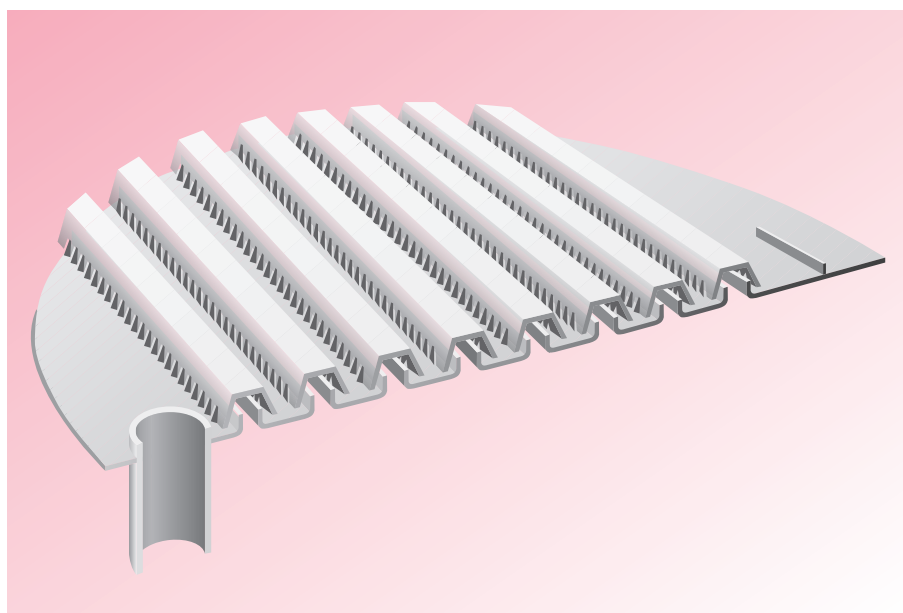
- Washing processes, for example caprolactam, HCl, H<sub>2</sub>S
- Hold-up time trays for reactions
- Natural gas drying
- Fractionating of fatty acids
- Rectisol washing process

### Materials

- High-grade steels, e.g. 304, 410 S, 316, 316 Ti, 316 L, 904 L, etc
- Hastelloy C4, aluminium, copper, titanium, monel and others
- Plastic materials: KERA, Diabon, PVC and others



▲ Thormann® hold-up tray DN 2500 mm for long dwell time in a reaction column with a liquid level of 200 mm and for small gas flows volumes.



◀ Cross section of Thormann® caps and vapour risers. A very good separation efficiency is achieved with even minimum amounts of vapour because the bent edges of the vaporisers prevent the liquid from trickling down.

# Montz Tunnel Trays

## Adaptable and sturdy

**The tunnel tray is a very sturdy, modular design developed by Montz. The modular design enables a high stability at low weight and consequently economic advantages compared to conventional designs like bubble caps. The variable elements allow a multitude of constructive designs and adaptation to all operating conditions.**

### Highlights

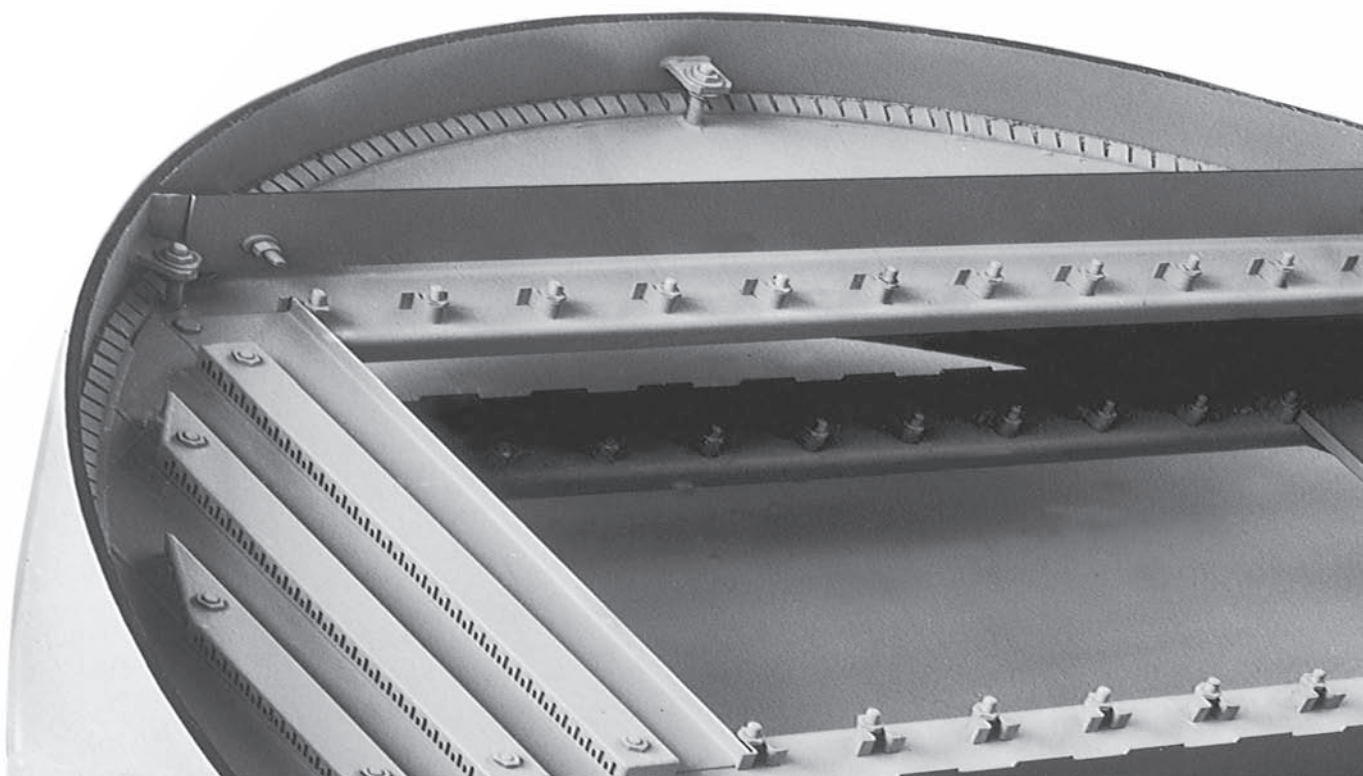
The tunnel tray manages standard separating processes as well as those with heavy solids contamination. Low susceptibility to fouling and contamination and a long service time are the main characteristics of the tunnel tray. Montz has extensive knowledge of the use of tunnel trays under the severest operating conditions.

### Characteristics

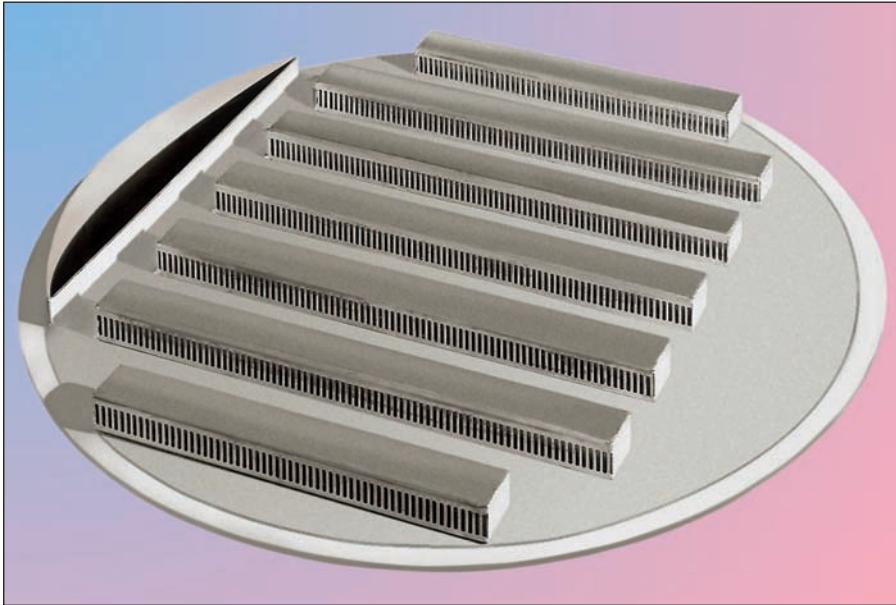
- Suitable for mass transfer under vacuum, standard and pressured conditions
- High separation efficiency up to 90%
- Low pressure drop
- Wide operating range like 25 to 110%
- Simple installation through manways
- Easy and problem-free cleaning by the use of steamers or liquid
- Customised designs for special applications

### Applications

- Absorption
- Glycol recovery
- Treatment of liquid manure
- Natural gas drying
- Coking plants, de-acidification plants, NH<sub>3</sub>-stripper
- Fractionation columns for absorption refrigerator plants
- Mash columns
- Hot regenerators
- Reactive distillations



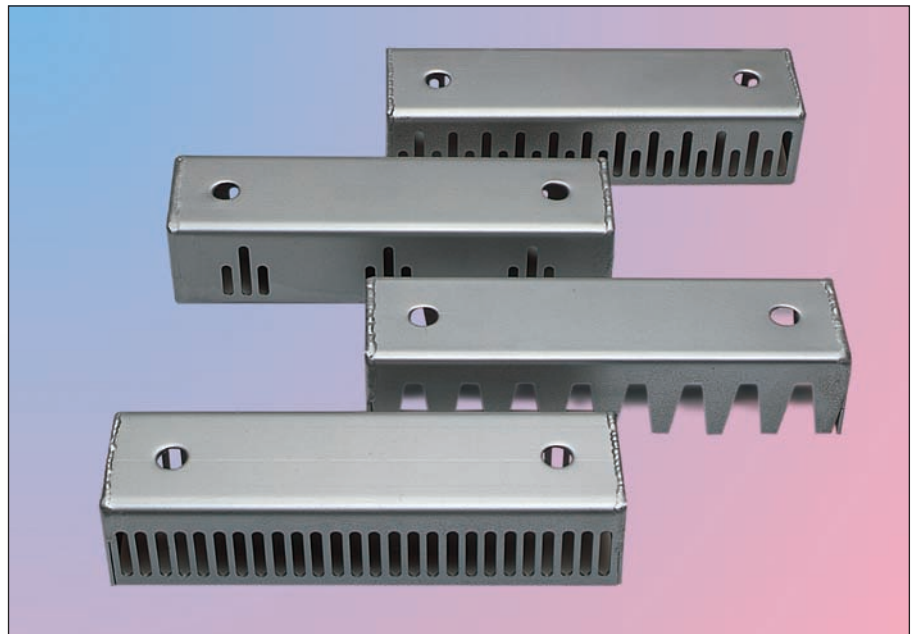




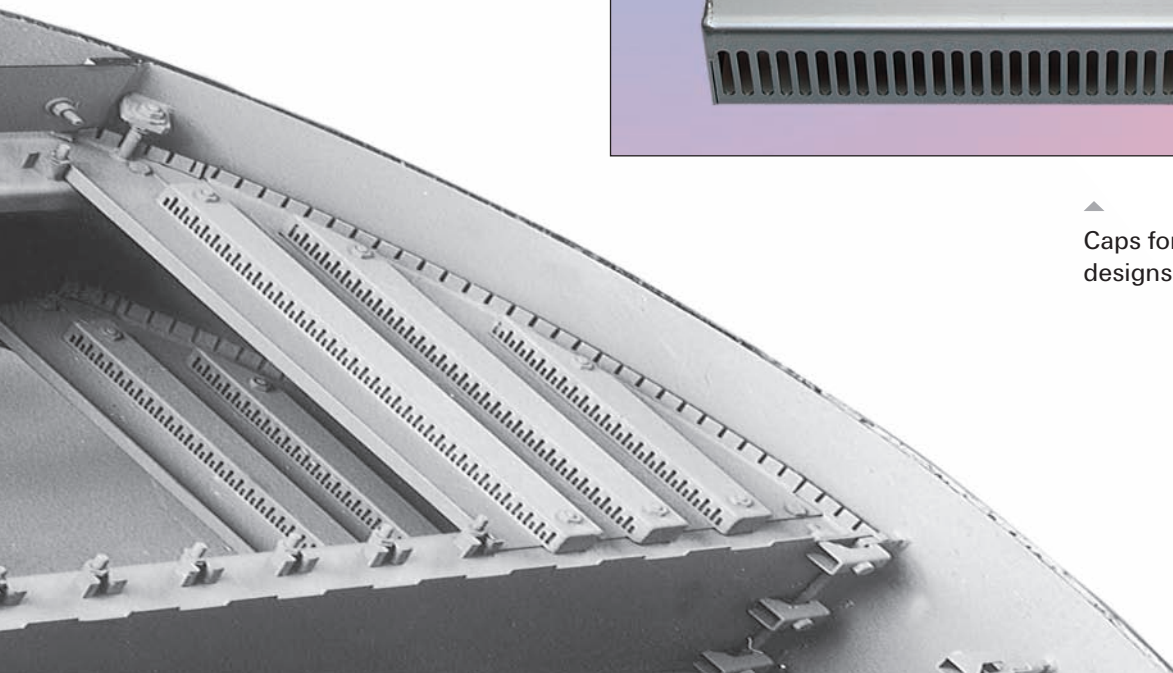
◀ Montz tunnel trays of special design, made of aluminium

**Materials**

- High-grade steels e.g. 304, 410 S, 316, 316 Ti, 316 L, 904 L, etc
- Hastelloy C4, aluminium, copper, titanium, monel and others
- Plastics: KERA, Diabon, PVC and others



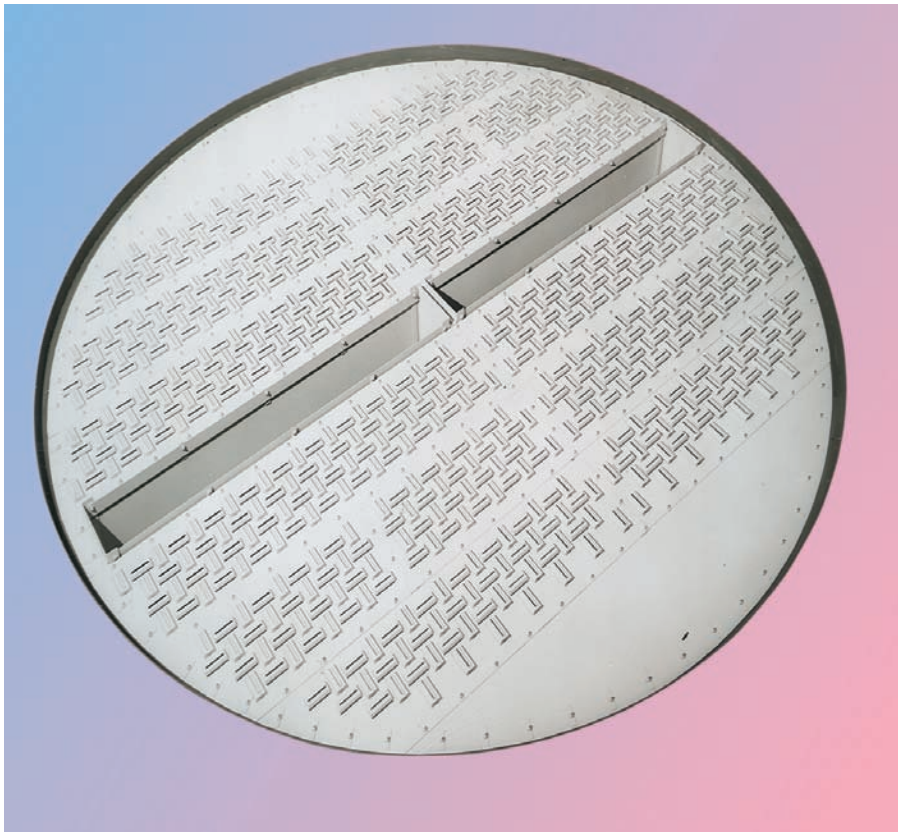
▲ Caps for tunnel trays of various designs



# Cross-Flow Tray Type KSG

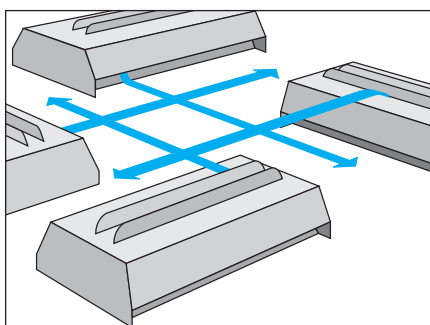
A high performance tray without any moving parts

The Montz cross-flow tray type KSG has been designed as a mass-transfer tray with the same efficiency as a valve tray but without any moving parts. It is thus ideal for the conversion of existing columns and for multipurpose distillation.

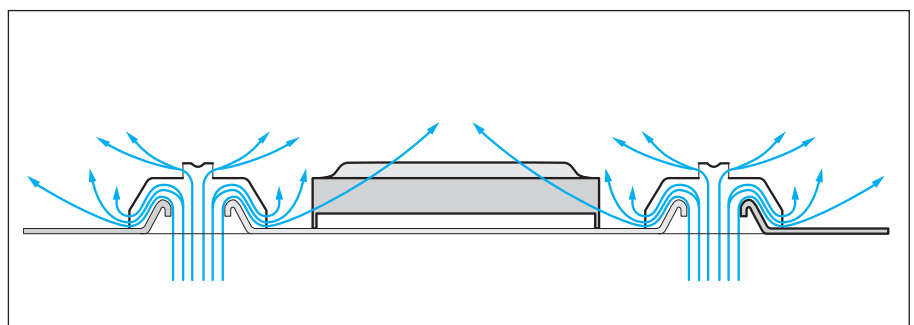


◀ Cross-flow tray DN 4400 with two passes. The tray elements are installed through raised manholes and are fixed by clamps at supporting rings inside the column.

▼ Principle of crossing steam flows and arrangement of the KSG-caps above the vapour slots



▼ Aerodynamic design of the vapour slots to ensure a low pressure drop.



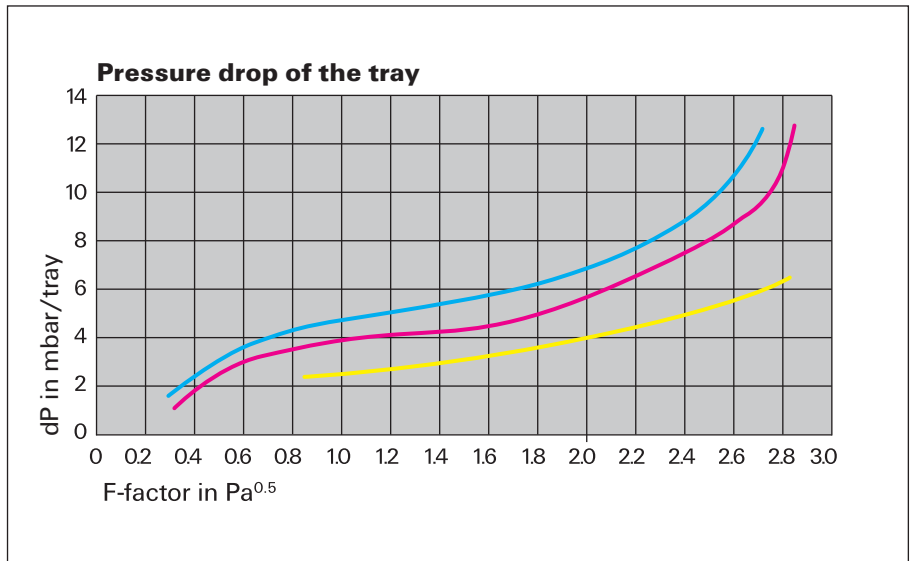
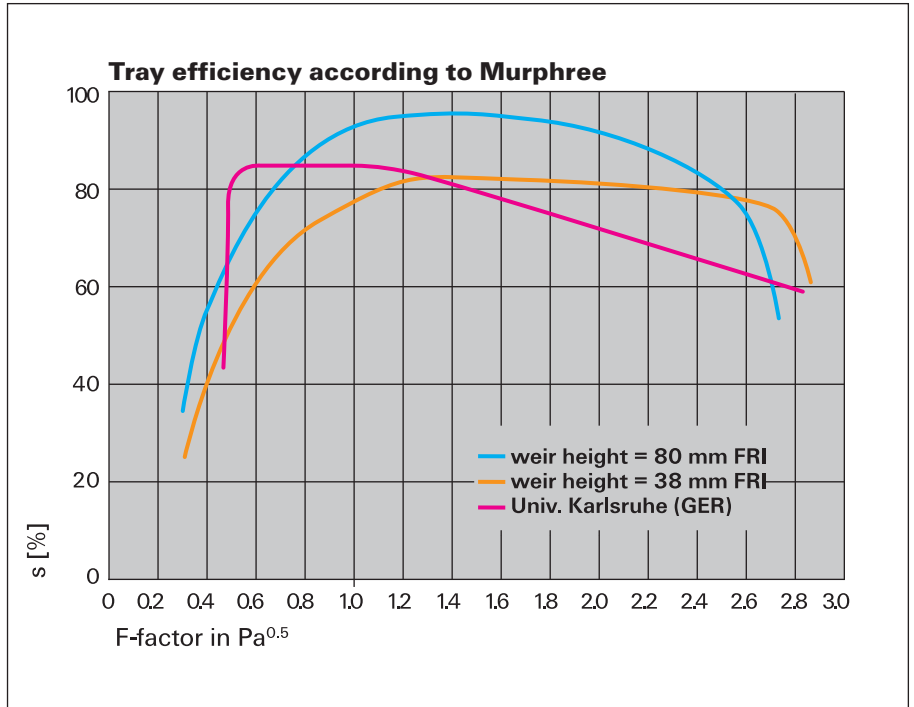


► Separation efficiency and pressure drop of the cross-flow tray

The usual collision of opposed vapour flow currents is avoided by the special design of the Montz high-efficiency tray: adjacent outflow cross-sections intersect at an angle of 90°. This has a positive effect on the rate of entrainment of the tray. Moreover, the design of the vapour channels with rounded edges ensures a low pressure drop of the tray.

This type of tray is used for distillation and absorption. Due to its wide range of loading it is also particularly suited for the revamping of existing columns to increase throughput. It has also stood the test for multipurpose distillation columns.

Materials: as for tunnel trays



► Special designs also allow the KSG-tray to be optimally adapted to various applications.

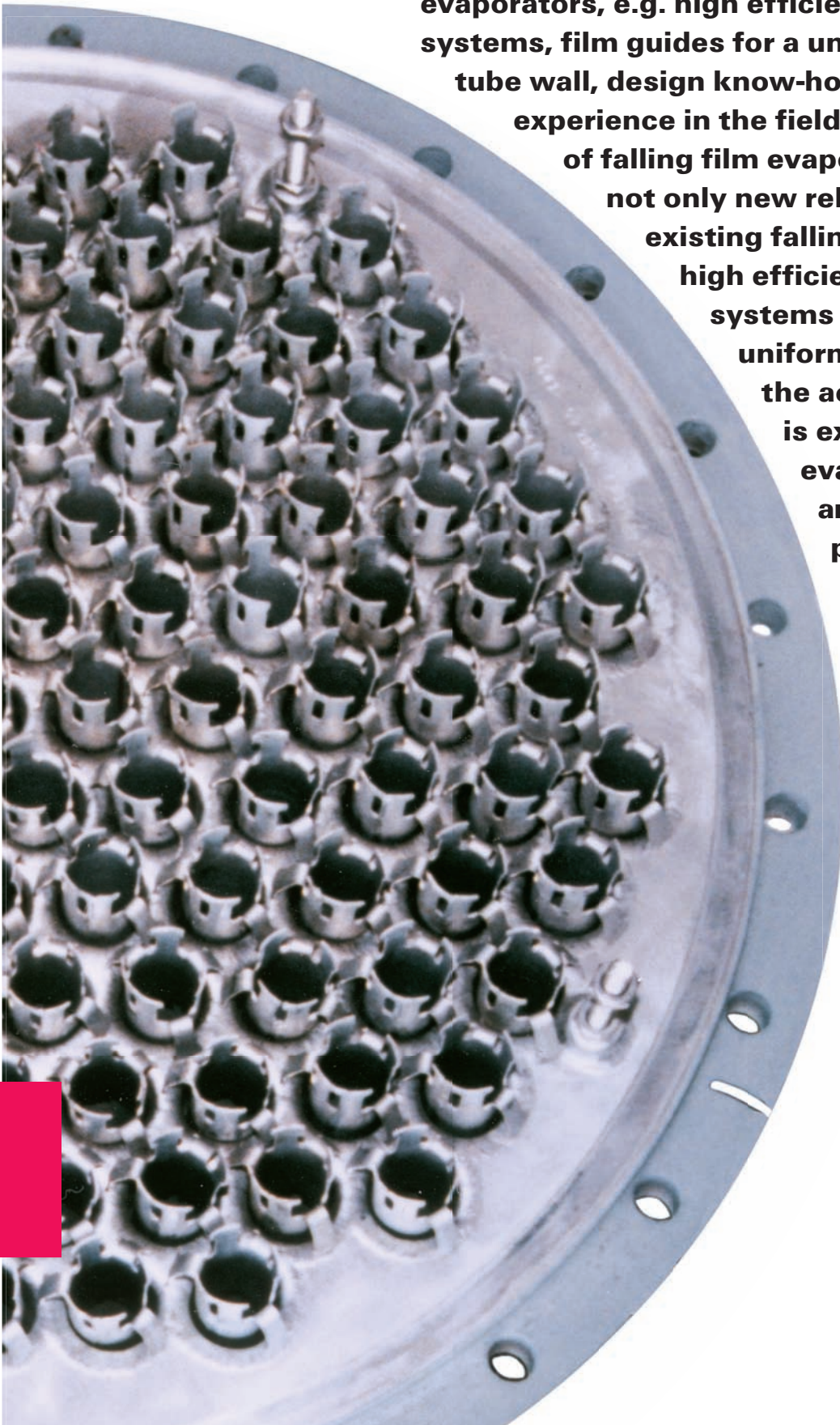


◀ Detail shot of a cross-flow tray

# Falling Film Evaporators

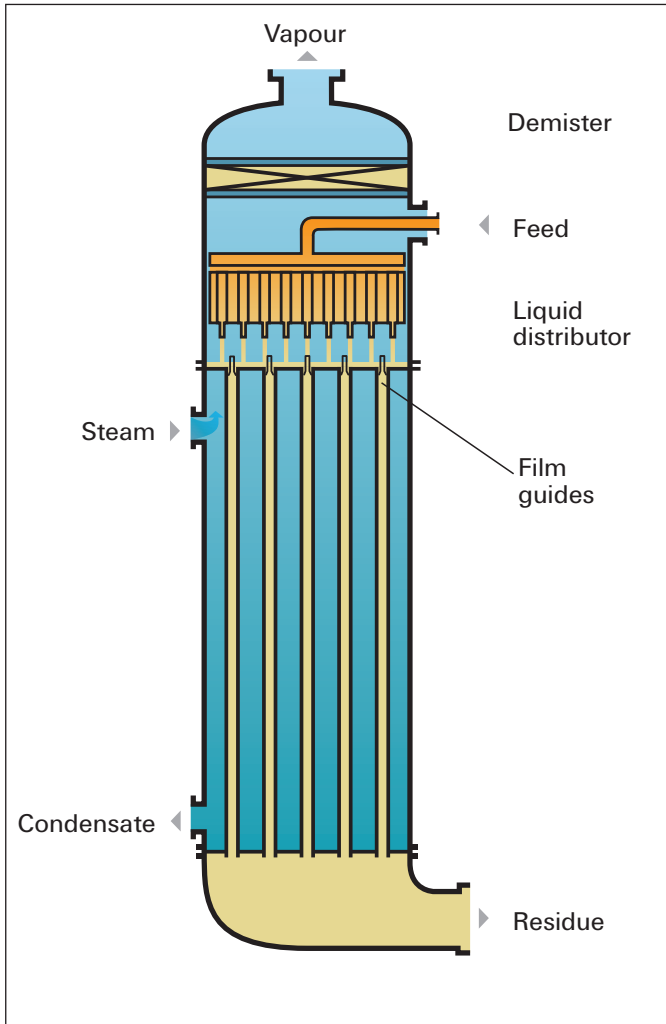
Gentle and economical product treatment

**Montz offers all components for falling film evaporators, e.g. high efficiency liquid distributor systems, film guides for a uniform wetting of the tube wall, design know-how and comprehensive experience in the fields of application and use of falling film evaporators. Montz equipts not only new reboilers but also upgrades existing falling film evaporators with high efficiency liquid distributor systems and film guides for a uniform wetting. The result in the achievable product quality is extra ordinary. Fallingfilm evaporators made by Montz are used wherever a gentle product treating and economic application is required.**

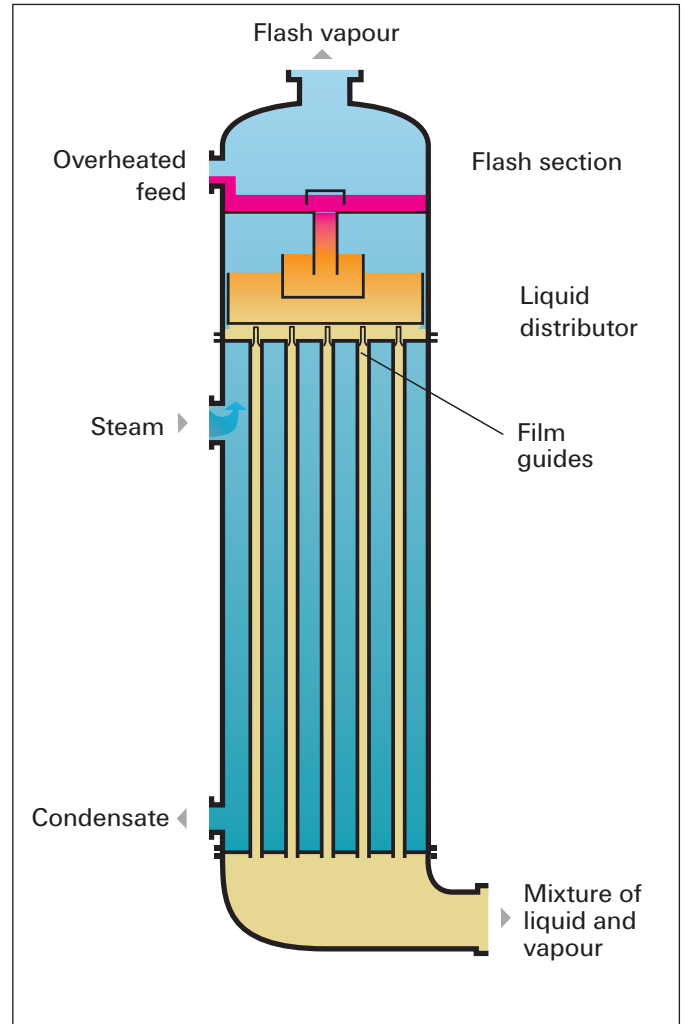


◀  
Tube plate of a falling film evaporator equipped with film guides.





Counter-current falling film evaporator



Co-Current falling film evaporator, special design for overheated feed

## Montz Falling Film Evaporator

### Characteristics

- Low liquid hold-up
- Short dwell time
- Minimum thermal imposition of the product
- Utilisation of waste heat for heating because very low average temperature differences are sufficient
- Heating with steam, product vapours, thermal oils etc.

### Applications

- Heat exchanger for vacuum fractionating columns
- Concentration of solutions
- Evaporation of fatty alcohols and fatty acids
- Heat recovery etc.

# Montz Process Engineering



## **Chemicals industry**

Plants and plant components for thermal separation technology



## **Food technology**

- Pectin • Yeast
- Starch • Glutamate
- Aroma recovery



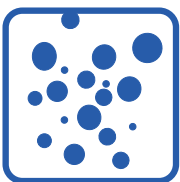
## **Pharmaceutical industry**

- Crystallisation
- Solvent recovery
- Active ingredient concentration



## **Alcohol technology**

- Potable alcohol
- Water-free alcohol
- Power alcohol
- Aromatic distillates
- Complete process lines

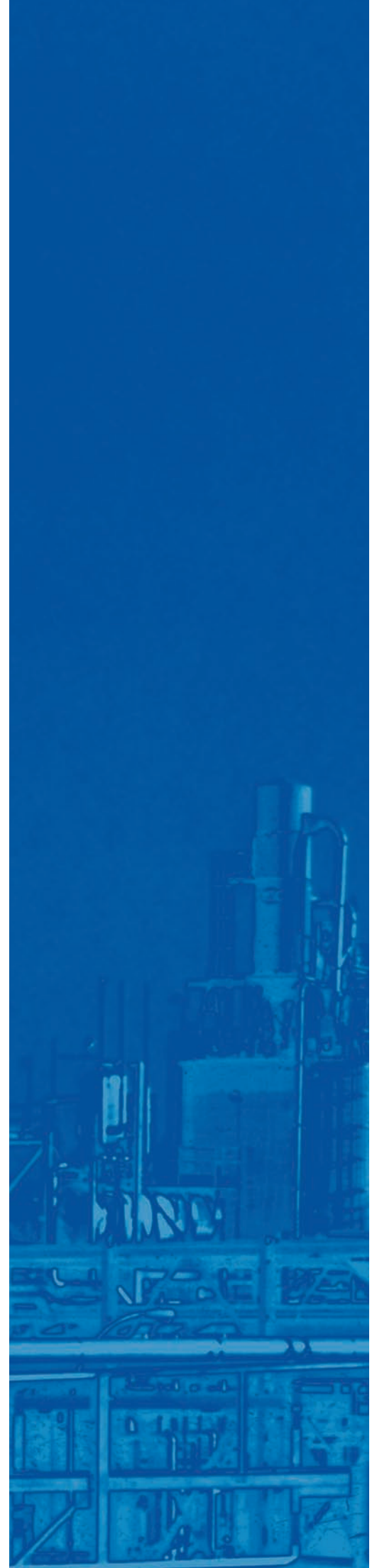


## **Ethanol derivatives**

- Acetaldehyde
- Glacial acetic acid
- Ethyl acetate



Process line to produce alcohol, stillage concentrate and CO<sub>2</sub> from grain







# Test equipment

Precise measuring for quality assurance

**An essential corporate principle at Montz is to ensure the optimum quality and efficiency of the range of products. That's why Montz has two state-of-the-art, flexible test plants. The liquid distributor test plant and the air-water-test plant. All products are carefully tested and checked here in the presence of the customers.**

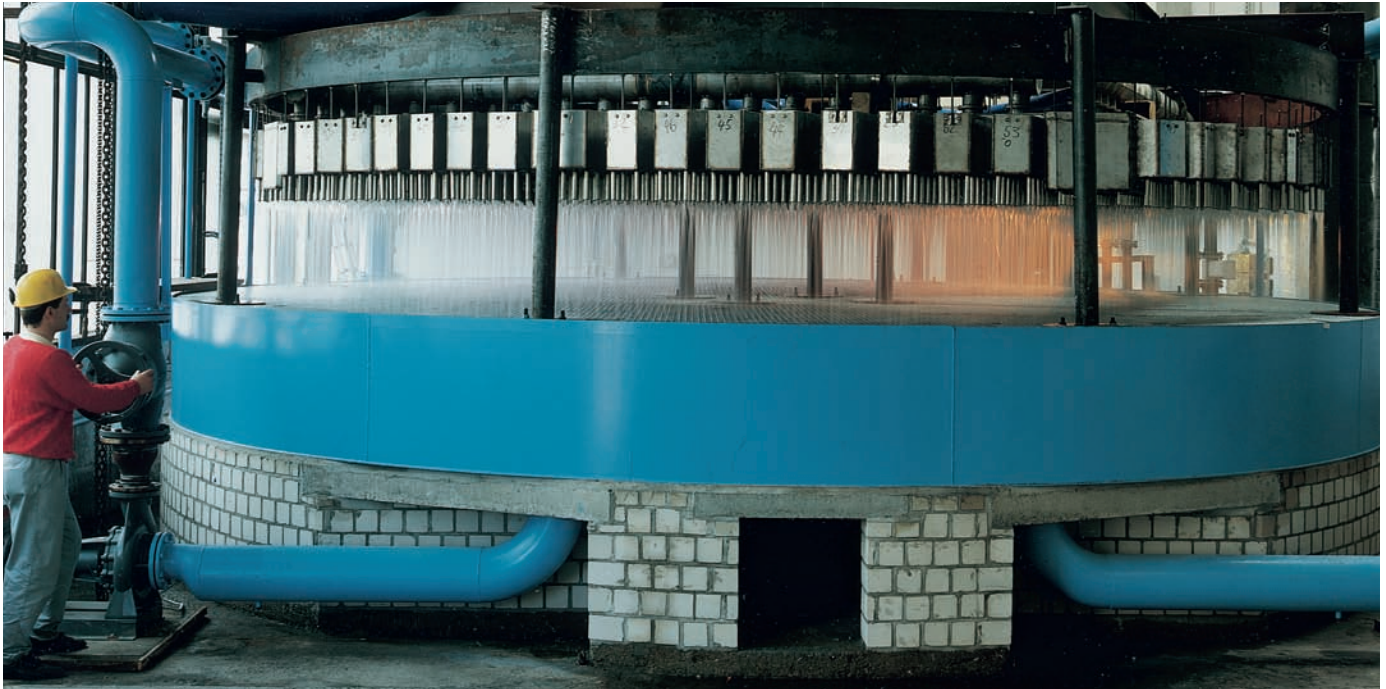


## **Air-water test equipment**

The Montz air-water test equipment is used for fluid-dynamic tests of column internals in accordance with the specific requirements of our customers. The following is offered:

- Test columns of a diameter of 100 to 3000 mm are available
- Tests of the minimum and maximum load limit of mass-transfer trays, structured packings or separator internals
- Determination of all essential data by means of precise measuring instruments: mass flow, pressure drop, entrainment, etc.

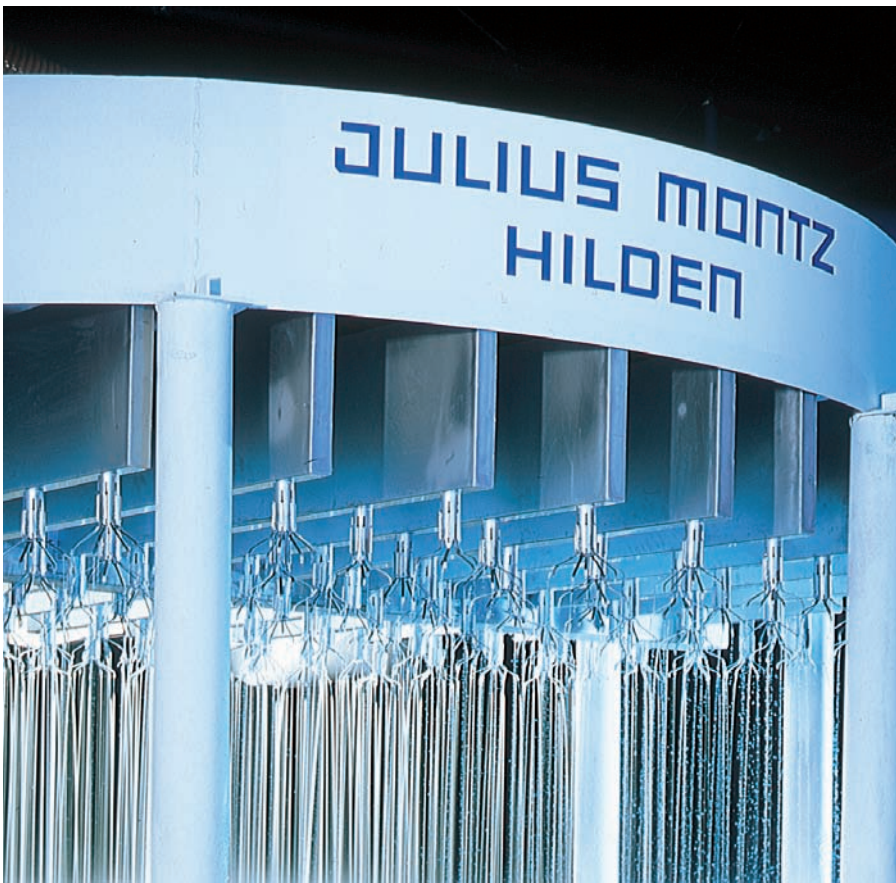




▲  
Montz distributor test rig  
diameter 8000 mm

### Liquid distributor test equipment

Each of the liquid distributors made by Montz are subjected to a quality test with water on our own test equipment. A separate test report is drafted for each distributor. These tests can also be performed in the presence of the customer.



This guarantees the typical top quality of Montz products. Almost any requirement can be fulfilled by us:

- Test rigs with diameters of 9000 mm and 2000 mm
- Test set-up with the suspension and levelling elements used in the column
- Flow rates exceeding 2500 m<sup>3</sup>/h
- Measuring the quality of distribution and of the operating ranges
- Quality control with regard to workmanship and dimensional accuracy

◀  
Montz channel-type distributor  
Type S DN 3000 on the test rig

# Services

**Complete service to improve the capacity of existing columns**

**The capacities of existing tray and random packing columns can be considerably improved by revamping with Montz structured packings. For this purpose, Montz offers complete services.**

**Improvement of the column efficiency**

- Higher throughput
- Improved product qualities
- Lower pressure drop
- Energy saving

**Service for revamping**

- Planning
- Supervision and teams
- Dismounting of existing internals
- Delivery and installation of packing internals
- Engineering and warranties for newly installed packing systems



Two columns DN 5600 and DN 3800 during revamping with Montz-Paks





◀ Packed column DN 4000 during installation of Montz-Pak Type B1-250



◀ Installation of Montz-Pak Type B1-300 into a column DN 5600 from which the existing valve trays have been previously removed. All supporting rings have been removed by torch-cutting.



# Apparatus engineering

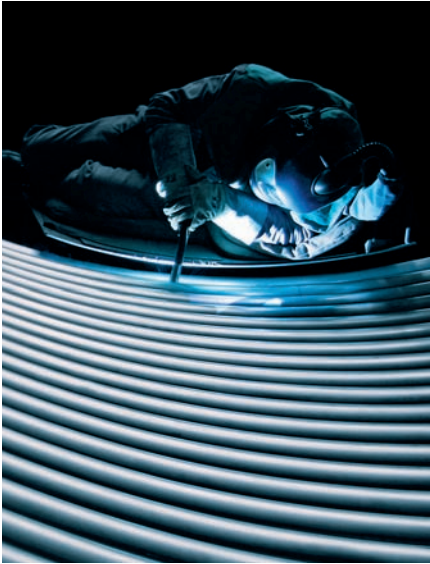
**Customised solutions for  
the chemical industry**

**A special service offered by Montz  
is the development of apparatus exactly adapted to the  
specific requirements of our customers. In particular in the  
field of special designs for the chemical industry, Montz has  
established itself on the basis of know-how  
and experience gathered through  
the years.**

▼  
Rectifying column with a diameter of  
2200 and a falling film  
evaporator of 250 m<sup>2</sup>







#### Inspections and technical codes

- TÜV
- Lloyd` s
- Stoomwezen
- ANCC
- Service des Mines
- AIB-Vinçotte
- ASME

▼  
Montz rectifying plant consisting of a column with mounted condenser, falling film evaporator, fitted wire mesh packing A3-500 and Montz liquid separator system



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Your partners for the  
Montzproducts world-wide.

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