Structured - Random Packing
Liquid Distributors
Structured packings are characterized by a very efficient technique and a versatile range of applications. The packings offer a high separation efficiency, good wettability and a low pressure drop. They can be adapted to address any fractionation problem for distillation, absorption and liquid-liquid extraction.

The special features of Montz packings allow for variable geometric dimensions and the choice of different surface structures. This flexibility can solve nearly any fractionation problem.

**Packing types A3, B1, BSH, C1 and M feature a variety of configurations, for example:**

- A3-type packing uses a woven wire gauze, ribbon or strip
- B1-type packing uses a cold rolled sheet metal foil ribbon or strip
- BSH-type packing uses an expanded metal ribbon or strip
- M-type packing has a curved shaped crimping regardless of the base material (wire gauze, cold rolled foil or expanded metal)

We also now offer an MN-type packing that has a NEW curvature to the crimping regardless of the base material (wire, gauze, cold rolled foil or expanded metal).

The waves are inclined toward the vertical, and together with the adjacent plate, they form intersecting flow ducts. This packing structure results in large interfacial areas and provides an intimate contact between the gas and liquid phase.

An exact adaptation to the respective requirements is ensured by special internals such as liquid distributors, flash equipment, liquid collector trays and vapor distributors. All these internals are carefully adapted to the packings and to the problem to be solved. They are subject to a permanent quality control.
These internals include:

- exactly operating liquid distributors
- low pressure drop collectors for the liquid phase
- uniformly operating vapor and gas distributors
- wall wipers to avoid bypass flows and to compensate for manufacturing tolerances
- flash equipment for an overheated feed
- support systems with large net-free areas

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

The packings are manufactured on computer-controlled lines to assure maximum accuracy and mechanical stability.

The high accuracy of fit and stability of Montz products are essential criteria for an economic and problem-free installation of the packings in either newly built or existing columns.

All Montz packings are manufactured in segments and are mounted through manholes or shell flanges.
Montz-Pak Type A3 fulfills the special requirements demanded by the fractionation of thermally unstable substances under vacuum. It has a special wire mesh with a capillary effect whose corrugated lamellae form the packing layers. With its low pressure drop and its high separation efficiency, it is also ideal for very low liquid loads.

**Characteristics**
- ideal for vacuum columns
- very low liquid loads (< 100 l/m²/h) are possible
- low pressure drop per theoretical stage
- high separation efficiency thanks to the good wettability of the packing surfaces
- capillary effect of the special wire mesh

**Applications**
The main fields of application are in the fractionation of thermally unstable substances which are rectified under vacuum from approximately 1 mbar.

**Applications include:**
- ethereal oils
- isomer mixtures
- fatty acids
- fatty alcohols
- deodorizing of edible oils
- degassing of transformer oils
- pilot columns

**Materials**
- stainless steels such as 304, 410 S, 316, 316 Ti, 316 L, and 904 L
- Hastelloy C4, aluminum, copper, titanium, monel, etc.
- other materials are available upon request

**Column Data**
- diameters from 40mm up to 7m and more
- liquid load from 20l/m²/h
- operating pressures from approximately 1mbar.
- minimal liquid hold-up

**Corrugation angles:**
- standard type with 60°
- 45° or other angles upon request

**Fractionating stages**
If using mixtures with good wetting properties, approximately 5 to 12 theoretical stages per meter are obtained in technical columns, depending on the packing surface.

**Assembly**
The packing layers are manufactured either as one piece or in segments. Installation can be made through shell flanges or manholes.

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**Detail shot of the plate of Montz-Pak Type A3-500**
MONTZ-PAK TYPE A3-500M
LOWEST PRESSURE DROP AT HIGH EFFICIENCIES

The new A3-500M offers a reduced pressure drop of 20% compared to the standard packing A3-500. Higher throughputs, lower total pressure drops, smaller tower diameters and tower debottlenecking are possible due to the optimized crimp geometry. The A3-500M is ideal in applications that are under high vacuum and have the smallest liquid distribution densities.

Characteristics
- lowest pressure drop per theoretical stage
- higher capacity
- equal separation efficiency to A3-500

Applications
The main applications are the separation of thermal unstable products that are separated under high vacuum up to 0.5 mbar.
- essential oils
- isomer mixtures
- vitamins
- fatty acids
- fatty alcohols
- isocyanates

<table>
<thead>
<tr>
<th>PAK-TYPE</th>
<th>SPECIFIC SURFACE m²/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3-500</td>
<td>500</td>
</tr>
<tr>
<td>A3-750</td>
<td>750</td>
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<td>A3-1000</td>
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<tr>
<td>A3-1200</td>
<td>1200</td>
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<tr>
<td>A3-1500</td>
<td>1500</td>
</tr>
<tr>
<td>A3-1900</td>
<td>1900</td>
</tr>
</tbody>
</table>

Other surface sizes are available upon request
Montz-Pak Type B1 is the result of many years of experience and developments in the field of thermal fractionating technology with structured packings. Montz-Pak Type B1 has proven its reliability in many technical applications. The excellent characteristics are assured by the regular arrangement and the special Montz surface structure.

**Characteristics**
- high throughput
- high flexibility
- high separation efficiency almost up to capacity limits
- low pressure drop
- liquid loads from 0.2 to >250 m³/m²/h
- can be adapted to any fractionating task by a variable specific surface

**Applications**
- vacuum columns
- normal and high-pressure columns
- absorption of components and pollutants from gas and air flows
- natural gas drying with glycols
- refinery columns (atmospheric and under vacuum)
- petrochemical columns
- exhaust air washing in aluminum rolling mills
- recovery of lube and rolling oil
- wastewater treatment with stripping columns
- revamping existing tray or random rings columns to improve the performance and capacity

**Column Data**
- column diameter 70mm up to 11m and more
- liquid load from 201/m²/h
- operating pressures from vacuum up to 100 bar
- minimal liquid hold-up

**Revamping**
The performance and capacity of existing columns such as crude-oil columns, natural gas dryers, vacuum distillations (for fatty alcohols, fatty acids, methyl ester, etc.) can be increased by revamping.

**Angles of inclination of the corrugations:**
- standard type with 45°
- 60° for particularly high throughputs (suitable to increase the capacity of existing columns)

**Separation stages**
More than five theoretical stages per meter are possible depending on the design.

**Assembly**
The packings are manufactured as one piece or in segments. Installation can be made through shell flanges or manholes.

**Materials**
- stainless steels such as : 304, 410S, 316, 316 Ti, 316L and 904L
- carbon steel
- Hastelloy C4, aluminum, copper, titanium, monel, etc.
- other materials are available upon request
Montz-Pak Type B1-250, Diameter 4000mm

**STANDARD TYPE (45°)**

<table>
<thead>
<tr>
<th>PAK-TYPE</th>
<th>SPEC. SURFACE m²/m³</th>
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<tbody>
<tr>
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<tr>
<td>B1-125</td>
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<td>B1-150</td>
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<tr>
<td>B1-200</td>
<td>200</td>
</tr>
<tr>
<td>B1-250</td>
<td>250</td>
</tr>
<tr>
<td>B1-300</td>
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<tr>
<td>B1-500</td>
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**TYPE FOR HIGH THROUGHPUTS (60°)**

<table>
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<th>SPEC. SURFACE m²/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1- 65.60</td>
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<tr>
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<tr>
<td>B1-150.60</td>
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<tr>
<td>B1-300.60</td>
<td>300</td>
</tr>
<tr>
<td>B1-350.60</td>
<td>350</td>
</tr>
<tr>
<td>B1-500.60</td>
<td>500</td>
</tr>
</tbody>
</table>

Other surface sizes available upon request.
The BSH-packing combines the essential features and characteristics of metal sheet and wire mesh packing. A remarkable characteristic of the BSH-packing is the special surface structure. This 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.

**Characteristics**
- high capacity and flexibility
- good wettability, thus ensuring excellent contact surfaces between vapor and liquid
- high fractionating efficiency almost up to capacity limit
- liquid loads 0.2 to >150 m³/m²/h
- low pressure drop
- solutions for any fractionating problem thanks to a variable specific surface

**Applications**
- vacuum columns
- normal-pressure and high-pressure columns
- absorption
- natural gas drying
- refinery columns
- petrochemical columns
- wastewater stripping columns
- fractionating columns for the chemical industry
- columns for dealcoholizing beer
- revamping of existing tray or random rings columns to improve their capacity

**Materials**
- stainless steels such as: 304, 410S, 316, 316 Ti, 316L and 904L
- carbon steel
- Hastelloy C4, aluminum, copper, titanium, monel, tantalum, etc.

**Other materials are available upon request.**

**Column Data**
- column diameter 70mm up to 11m and more
- liquid load from 20 l/m²/h
- operating pressures from vacuum up to 100 bar
- minimal liquid hold-up

**Separation stages**
Eight theoretical stages per meter and more are possible depending on the design.

**Assembly**
The packing layers are manufactured either as one piece or in segments. Installation in the columns is effected either through shell flanges or manholes.

**Standard Type (45°)**

<table>
<thead>
<tr>
<th>PAK-TYPE</th>
<th>SPEC. SURFACE m²/m³</th>
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<tbody>
<tr>
<td>BSH-250</td>
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<tr>
<td>BSH-300</td>
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<td>BSH-350</td>
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<td>BSH-400</td>
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<tr>
<td>BSH-500</td>
<td>500</td>
</tr>
<tr>
<td>BSH-750</td>
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</table>

**Type for High Throughputs (60°)**

<table>
<thead>
<tr>
<th>PAK-TYPE</th>
<th>SPEC. SURFACE m²/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSH-250.60</td>
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<tr>
<td>BSH-300.60</td>
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<tr>
<td>BSH-350.60</td>
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<td>BSH-400.60</td>
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<tr>
<td>BSH-500.60</td>
<td>500</td>
</tr>
<tr>
<td>BSH-750.60</td>
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</tbody>
</table>

Other surface sizes available upon request.
The Montz-Pak Type M and Type MN are further developments of the tried and trusted Montz structured packing Type B1, A3 and BSH. It has its own patent coverage. The optimized crimp geometry creates two packing types that meet the demands for high separation efficiency and throughput exceptionally well.

The new Type MN-series gives 30% more separation efficiency along with higher throughput capacity when compared to standard packing crimps. Higher purities, small column heights and simple tower debottlenecking are now possible.

The Type M-series allows throughput increases of 30% compared to columns equipped with standard packing types due to the reduced pressure drop. This packing only offers the same efficiency as standard packing types.

Both packing types are patented in the USA and Europe. Layer height depends upon crimp shape which prevents liquid hold-up at the lower end of the packing layer at high gas loads.

Type M and Type MN packing are ideal for new columns or tower revamps. Revamps from standard packed columns to the new high performance packing types consistently deliver outstanding performances.

Applications
- vacuum columns
- normal-pressure and high pressure columns
- absorption
- natural gas drying with glycols refinery columns
- revamping existing packing, random rings or tray columns

Characteristics Type M
- maximized capacity
- lowest pressure drop
- same separation efficiency compared to standard packing types

Characteristics Type MN
- higher capacity
- lower pressure drop
- highest separation efficiency

Applications
- vacuum columns
- normal-pressure and high pressure columns
- absorption
- natural gas drying with glycols refinery columns
- revamping existing packing, random rings or tray columns

Characteristics Type M
- maximized capacity
- lowest pressure drop
- same separation efficiency compared to standard packing types

Characteristics Type MN
- higher capacity
- lower pressure drop
- highest separation efficiency

Available Packing Types

<table>
<thead>
<tr>
<th>PAK-TYPE</th>
<th>SPEC. SURFACE m²/m³</th>
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<tr>
<td>B1-250M</td>
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<tr>
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<tr>
<td>B1-350MN</td>
<td>350</td>
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<tr>
<td>B1-500MN</td>
<td>500</td>
</tr>
</tbody>
</table>

Other surface sizes available upon request.
Random packings are an economic solution to increase tower efficiency/capacity and are ideal for new and existing towers.

**SADDLE RINGS**
*Ideal For Both High Pressure And Vacuum Towers*

Metallic saddle rings (formerly sold as M/s. Norton Type IMTP or Nutter rings, now owned by Koch and Sulzer respectively) give the best of both worlds in terms of performance i.e. low-pressure drop and high efficiency. Hence it can be effectively used in both high pressure as well as vacuum towers. Some of its other advantages include large effective interfacial area, high mechanical strength (its monolithic construction overcomes the problem of "opening out" at ends as experienced in ring shaped packings) and low cost. It is available in various sizes, which give different combinations of efficiency and pressure drop. Stainless Steel 304ss and 316ss are offered for immediate shipment.

The following sizes are currently available: No.25, No.40, No.50, No.70.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Piece Density pcs/m³</th>
<th>Surface Area m²/m³</th>
<th>Voidage (%)</th>
<th>Packing Factor</th>
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<td>96.6</td>
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<tr>
<td>MSR #50</td>
<td>15000</td>
<td>100</td>
<td>98</td>
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</tr>
<tr>
<td>MSR #70</td>
<td>4625</td>
<td>60</td>
<td>98.5</td>
<td>12</td>
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</tbody>
</table>

**PALL RING**
*Perfect In-kind Replacement Packings*

These traditional ring type packings are mostly made for in kind replacement. They are offered for immediate shipment in 304ss and 316ss stainless steel and in other specialty metallic alloys by special request.

Currently available in various sizes such as 16mm, 25mm, 38mm, 50mm and etc.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Piece Density pcs/m³</th>
<th>Surface Area m²/m³</th>
<th>Voidage (%)</th>
<th>Packing Factor</th>
</tr>
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<tbody>
<tr>
<td>MPR# 16mm</td>
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<td>81</td>
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<tr>
<td>MPR# 25mm</td>
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<td>206.7</td>
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<tr>
<td>MPR# 38mm</td>
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<td>96.08</td>
<td>40</td>
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<td>MPR# 50mm</td>
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<td>102.1</td>
<td>95.9</td>
<td>27</td>
</tr>
</tbody>
</table>

**METALLIC AND CARBON RASCHIG RINGS**
*Corrosion And Thermal Shock Resistant*

Raschig rings are commonly made from carbon steel, exotic metallic alloys, or graphite carbon black and are used in specific applications demanding good corrosion and thermal shock resistance. They are resistant to most acids, alkalis and solvents at high temperatures and also display good erosion and thermal shock resistance. At the same time they have high crushing strength due to increased thickness over other random packing and therefore have a long service life.

They are currently available in variable sizes such as 25mm, 38mm and 50mm.
LIQUID DISTRIBUTORS
KNOW-HOW FROM MONTZ FOR MAXIMUM 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 acquired the know-how necessary to design efficient liquid distributors.

Each of the distributors consists of a centrally arranged main channel with side channels branching off from this. Central and side channels form a communicating system so that liquid level gradients within the distributor are avoided.

The individual channels are fixed at a supporting ring and are individually and exactly adjustable (i.e. the distributor is not situated on the packing bedding). The liquid is fed via a pre-distributing system into the main channel of the distributor. Assembly can be made through shell flanges or manholes.

**General features of all Montz Liquid Distributors:**
- Uniform distribution: deviations between the individual drain tubes ≤3 to 5%
- Numbers of drip points: 70 to <250 per m² (depending on application and liquid load)
- Liquid loads: depending on the design of the distributor 0.1 to >250 m³/m²/h (distributors for 201m³/h have been successfully applied e.g. distillation of glycerine)
- Flexibility: standard turn down ratio 1:3 (higher ranges of loading – e.g. 1:10 and more – are possible using multi-stage distributors)
- Design know-how for viscous liquids
- Diameters range from 70 mm to 12 m and more
- The same design principle applies to diameters from 200 mm to >12 m
- Liquid feed by pre-distribution system can be adapted to most applications
- Contamination is reduced because our designs are resistant to dirt and sedimentable impurities
- Can be adjusted easily with standard fitter’s tools
- Fits solidly against the column wall
- Installation and inspection can be made through manholes for columns from DN 800; smaller columns can be accessed through shell flanges.
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 and is split into a number of small individual flows. The design enables drip point densities of at least 100 per m² for even small amounts of liquid.

**Channel-style Type S**
- liquid distributor for lowest volumetric flows (smallest flows to date around 20 l/m²/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: approximately 1:3
- 2-stage: approximately 1:10
  (higher ranges upon request)
- number of drip points 100 to 1,000 per m²
- throughputs 0.02 to approximately 70 m³/m²/h
- insensitive to sedimentable dirt particles

**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.

**Special applications**
- non-corrosive materials such as tantalum, zirconium and titanium are usually standard
- liquid distributor Type S to sprinkle tube bundle reactors filled with catalyst
- distribution of high-viscosity liquids, for example 1300 mPas

**Detailed view of the Type S**
Note the drip pattern of this Type S specially designed liquid distributor for use in a partition column.

A Montz Type S liquid distributor made of aluminum, DN2400 designed for 100 l/m²/h up to 750 l/m²/h.

The Montz Type S liquid distributor can be specially designed for the lowest liquid sprinkling densities.

Note the drip pattern of this Type S specially designed liquid distributor.
The following charts will give you an idea of the efficiency of Montz packings. Details are given on the separation efficiency and pressure drop of the main types of packings. Liquid loads B in m³/m²/h.

**MONTZ-PAK TYPE A3-500**

**SEPARATION EFFICIENCY**

**PRESSURE DROP**

**MONTZ-PAK TYPE A3-500M**

Separation efficiency in system chloro-/ethylbenzene for Montz-Pak A3-500M

Pressure drop in system chloro-/ethylbenzene for Montz-Pak A3-500M and A3-500

Pressure drop in system air/water for Montz-Pak A3-500M (B in m³/m²/h)

**MONTZ-PAK TYPE A3-750**

**SEPARATION EFFICIENCY**

**PRESSURE DROP**

**MONTZ-PAK TYPE B1-100**

**SEPARATION EFFICIENCY**

**PRESSURE DROP**
PERFORMANCE CHARTS
OVERVIEW OF PERFORMANCE AND PRESSURE DROP

MONTZ-PAK TYPE B1-250M

Separation efficiency in system cyclohexane/n-heptane for Montz-Pak B1-250M

Pressure drop in system cyclohexane/n-heptane for Montz-Pak B1-250M

Pressure drop in system air/water for Montz-Pak B1-250M (B in m³/m²h)

MONTZ-PAK TYPE B1-300

SEPARATION EFFICIENCY

PRESSURE DROP

MONTZ-PAK TYPE B1-350

SEPARATION EFFICIENCY

PRESSURE DROP

MONTZ-PAK TYPE B1-350M

Separation efficiency in system cyclohexane/n-heptane for Montz-Pak B1-350M

Pressure drop in system cyclohexane/n-heptane for Montz-Pak B1-350M

Pressure drop in system air/water for Montz-Pak B1-350M (B in m³/m²h)
PERFORMANCE CHARTS
OVERVIEW OF PERFORMANCE AND PRESSURE DROP

**MONTZ-PAK TYPE BSH-350**

**SEPARATION EFFICIENCY**

![Graph](image)

**PRESSURE DROP**

![Graph](image)

**MONTZ-PAK TYPE BSH-400**

**SEPARATION EFFICIENCY**

![Graph](image)

**PRESSURE DROP**

![Graph](image)

**MONTZ-PAK TYPE BSH-500**

**SEPARATION EFFICIENCY**

![Graph](image)

**PRESSURE DROP**

![Graph](image)

**MONTZ-PAK TYPE BSH-750**

**SEPARATION EFFICIENCY**

![Graph](image)

**PRESSURE DROP**

![Graph](image)
MONTZ QUALITY
PRECISE MEASURING FOR QUALITY ASSURANCE

It is our corporate practice to assure the optimum quality and efficiency of our products which is why we have two state-of-the-art flexible test plants (an air-water test plant and a liquid distributor test plant). It is here that all products are carefully tested and checked often in the presence of our customers.

**Air-water test equipment**
Our air-water test equipment is used for fluid-dynamic tests of column internals in accordance with the specific requirements of our customers. We offer the following:
- test columns of a diameter of 100 to 2500 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.

**Liquid distributor test equipment**
This helps assure the top quality of Montz products. We can fulfill nearly any requirement:
- test rigs with diameters of 8000 mm and 2000 mm
- test set-up with the suspension and leveling elements used in the column
- flow rates exceeding 2000 m³/h
- measuring the quality of distribution and of the operating ranges
- quality control with regard to workmanship and dimensional accuracy

A Montz channel-style Type S DN 3000 liquid distributor 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 AMACS or Montz structured or random packings.

We can help you improve the column efficiency
- higher throughput
- improved product qualities
- lower pressure drop
- energy savings

Our affiliates can help you with revamping services
- planning
- supervision and teams
- dismounting of existing internals
- delivery

AMACS is the exclusive U.S. manufacturer/distributor for Julius Montz GmbH
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Phone: 713-434-0934 • Fax: 713-433-6201
E-mail: amacs@amacs.com

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