



## Mass transfer trays for:

- Refineries
- Chemical and petrochemical industries
- Environmental applications

# Our program

## Products, installation and technical support

### We offer solutions...

...to increase the performance of your columns:

- design and optimization of mass transfer trays
- process simulation
- design of exposed column sections like feed and reflux arrangements or column sumps

### We supply...

...proven mass transfer trays:

- various valve trays
- sieve trays including dual-flow trays
- bubble cap trays

... and special tray constructions:

- cascade trays
- chimney trays
- shower decks
- retention trays
- trays for fouling or other contaminated media

### Installation

On demand we can install trays at your plant, at job-site or at the column vendor's premises.

### Materials

We manufacture trays of carbon steel, stainless steel, nickel alloys, titanium and zirconium.

All tray types (except valve trays) can also be manufactured of the following plastic materials:

PPH, PE, PVC, PVC-C, PVDF, ECTFE, PTFE, TFM and PTFE/graphite combinations.

Our team is certified to process all these materials.

### Technical support

For emergencies we provide spare parts and organise rapid replacement deliveries.



RVT Process Equipment has been certified according to ISO 9001 since 1996, and according to ISO 14001 since 2010.

We have been a member of the Fractionation Research, Inc. (FRI) since 2005.

# Sieve tray and dual flow tray

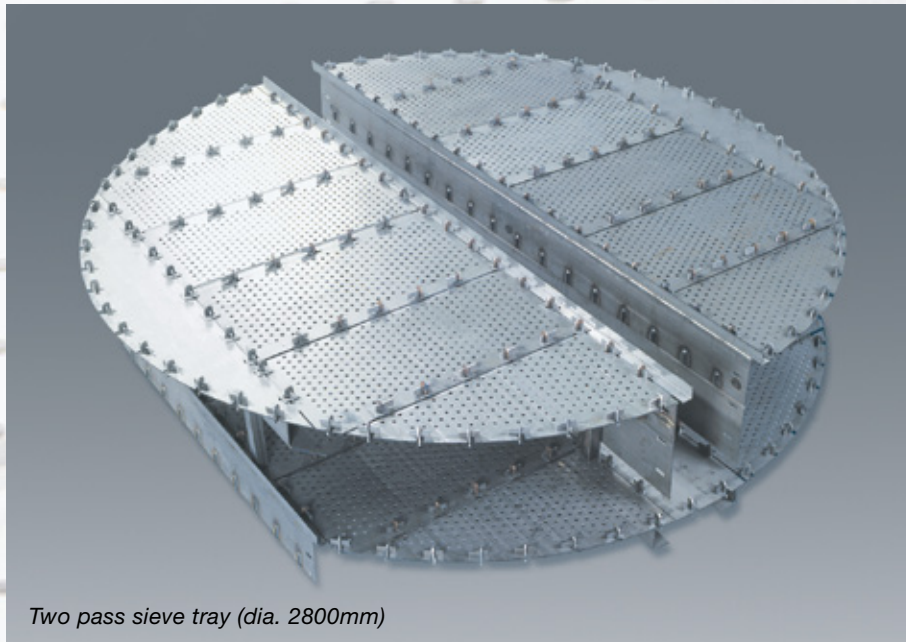
## The economical and the specialized type

### Sieve tray

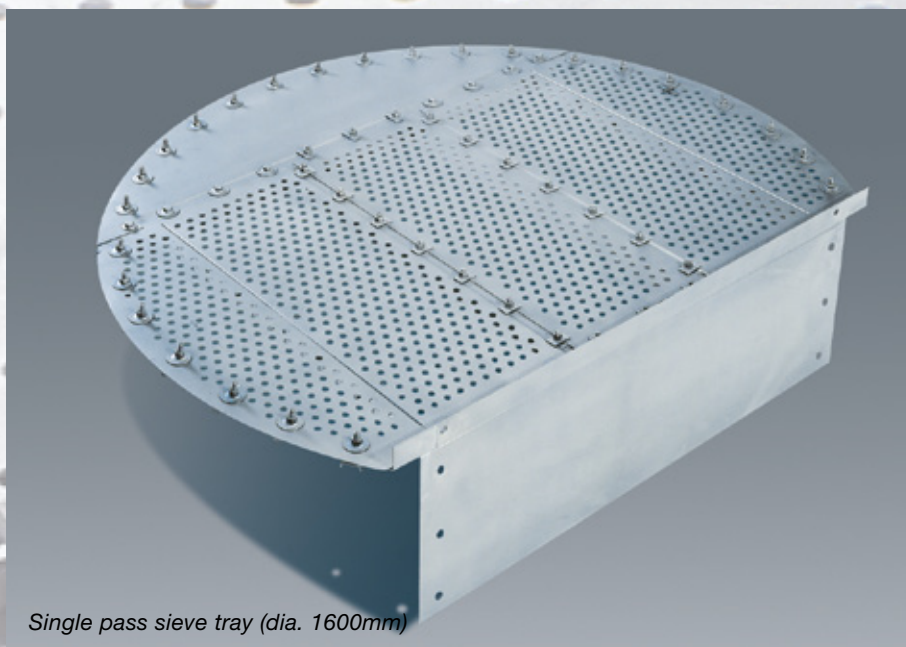
Sieve trays are a low-priced type of mass transfer trays. The operation range of these perforated trays is lower than that of valve trays.

### Dual flow tray

Dual flow trays are sieve trays without downcomers. They are mainly applied when fouling or polymerization has to be expected.



*Two pass sieve tray (dia. 2800mm)*



*Single pass sieve tray (dia. 1600mm)*

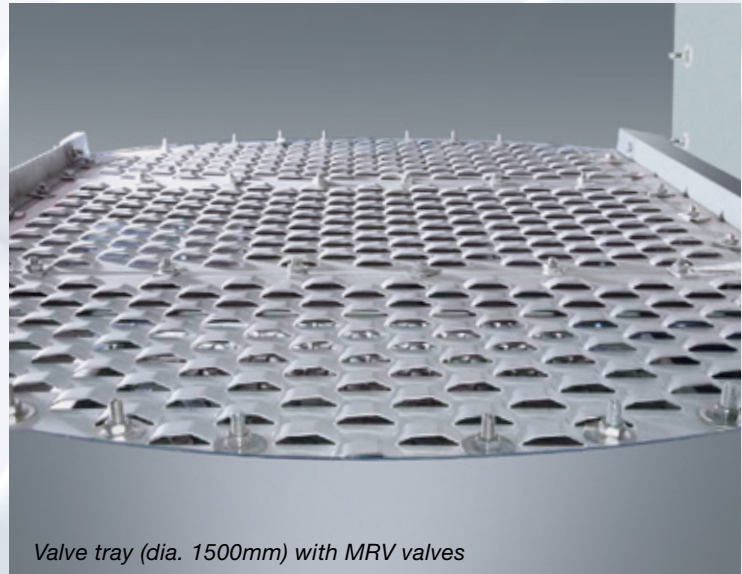
# Valve tray

## The multi-purpose type

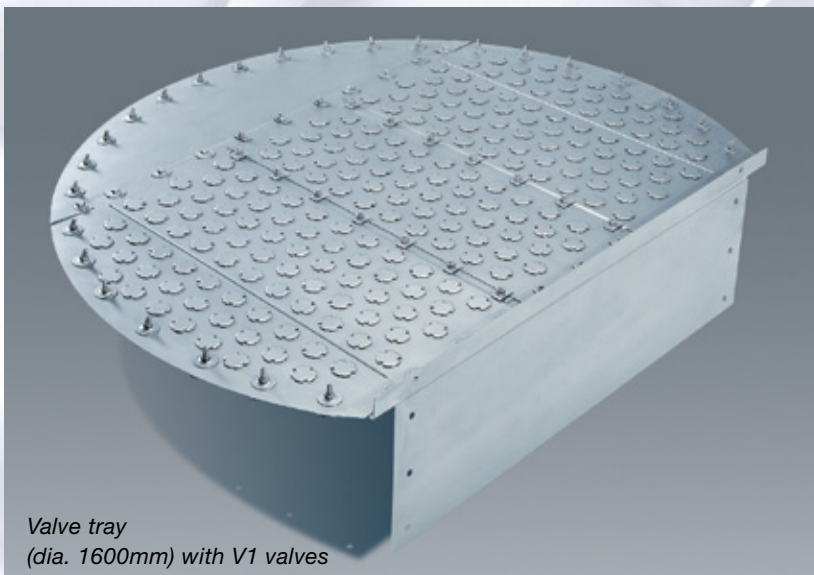
### Valve tray

Valve trays are the most commonly used tray types because of their suitability for a large variety of mass transfer applications.

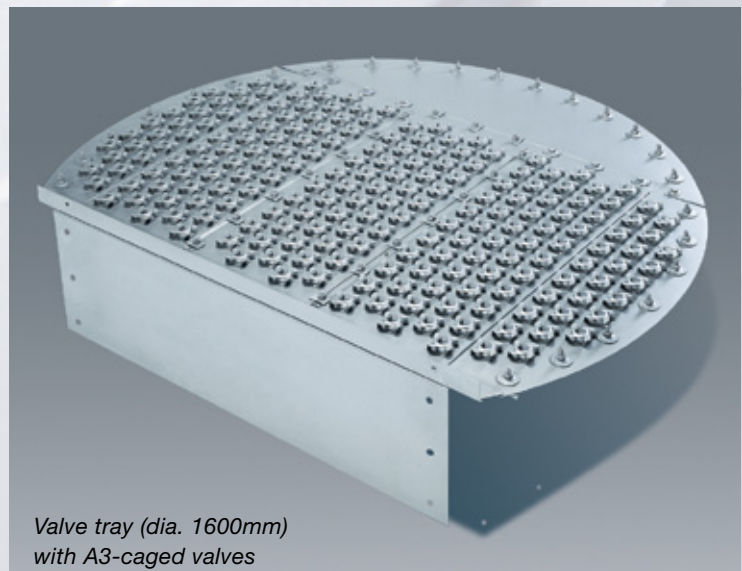
They are characterized by a high capacity and a large load range, which results in good mass transfer rates. A special valve type has been developed for the application of contaminated media.



*Valve tray (dia. 1500mm) with MRV valves*



*Valve tray  
(dia. 1600mm) with V1 valves*



*Valve tray (dia. 1600mm)  
with A3-caged valves*

### V1 valve

Movable standard valve with integrated legs and sharp-edged orifices in tray plates.

- initial rise is defined by three integrated spacers
- can be equipped with anti-rotation device
- valve rise adjusts to gas flow rates
- suitable for most applications



### V4 valve

Same basic valve design as the V1 valve. A venturi-shaped orifice in the tray deck is used to reduce pressure drop.

The range of V1 and V4 valves is completed by valves without initial rise (V1X / V4X) and their heavier models (V1XS / V4XS).

### A3 valve

Valve with non-moving cage with moving valve disk and sharp-edged orifices in tray plates.

- low-wear
- multi-purpose suitability, also in processes with fouling tendency



### A11 valve

The A11 valve is a variation of the caged valve with reduced orifice diameter. At lower vapour loads, a more regular valve pattern on the active area of the trays can be achieved with this valve type.

### A4 valve

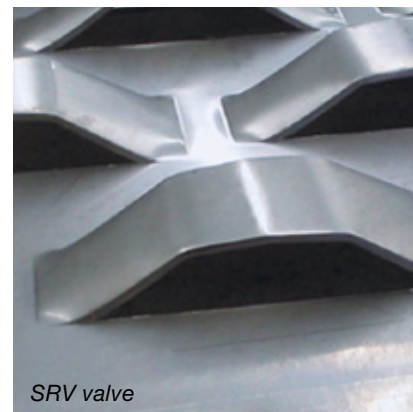
A variation of the A3 caged valve providing lower pressure drop by Venturi-shaped orifice in the tray deck.



### SRV valve

Large fixed valve.

- less susceptible to fouling
- suitable for contact with corrosive substances
- in carbon steel available up to 5mm tray deck thickness



### MRV valve

Newly developed, small fixed valve (patent pending).

- tapered lateral vapour outlets
- good turndown capability
- multi-purpose suitability



# Bubble cap tray

## The conventional type

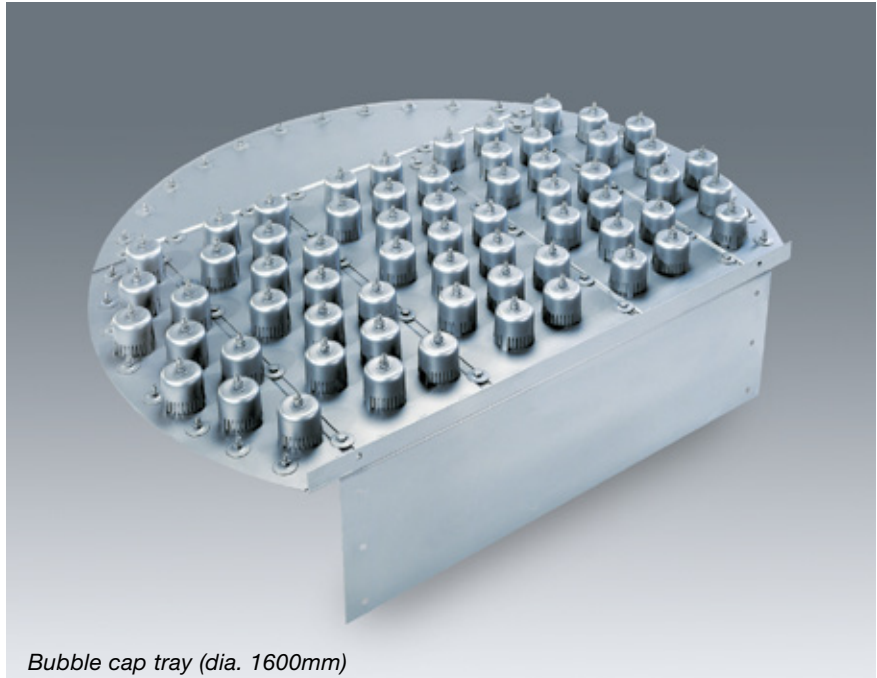
### Bubble cap tray

Conventional bubble cap trays are well-proven in applications with following conditions:

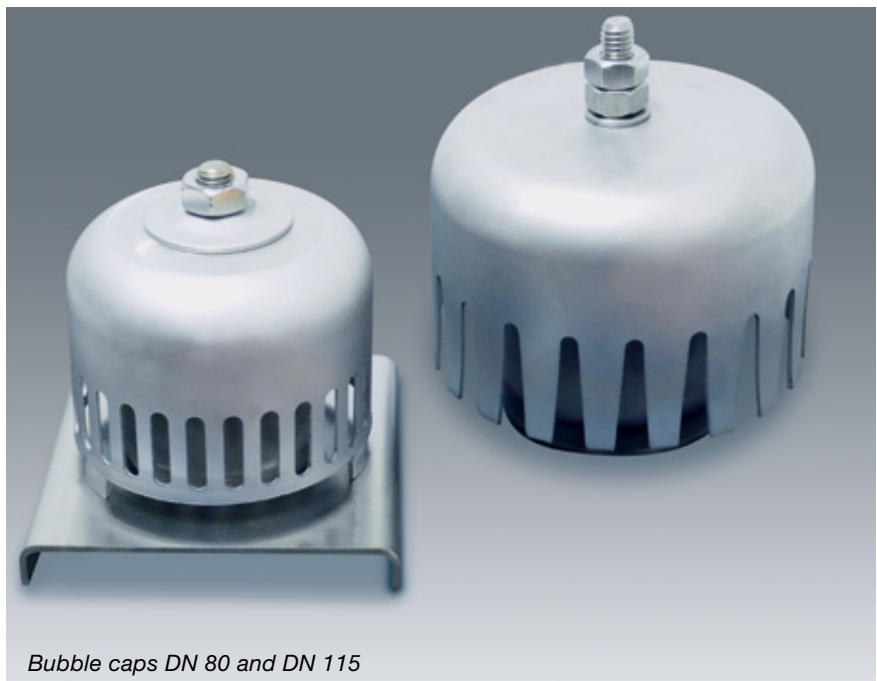
- very large loading ranges
- very low liquid loads
- very low gas loads
- continuous liquid hold up
- low leakage rates

We provide a wide variety of bubble cap shapes and diameters.

We also assemble bubble caps specified or supplied by our customers.



*Bubble cap tray (dia. 1600mm)*



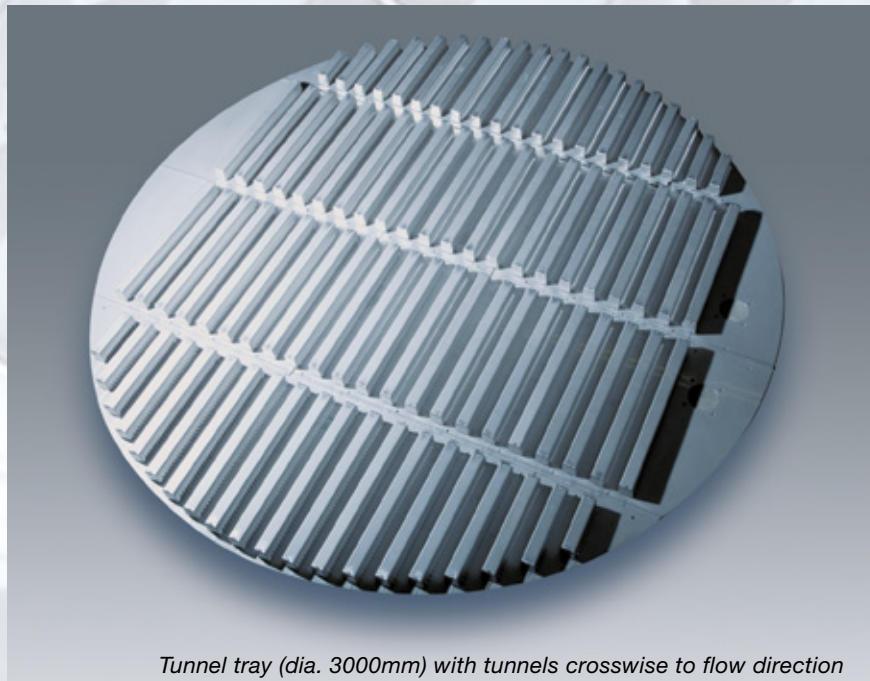
*Bubble caps DN 80 and DN 115*

# Tunnel tray

## The reliable type

### Tunnel tray

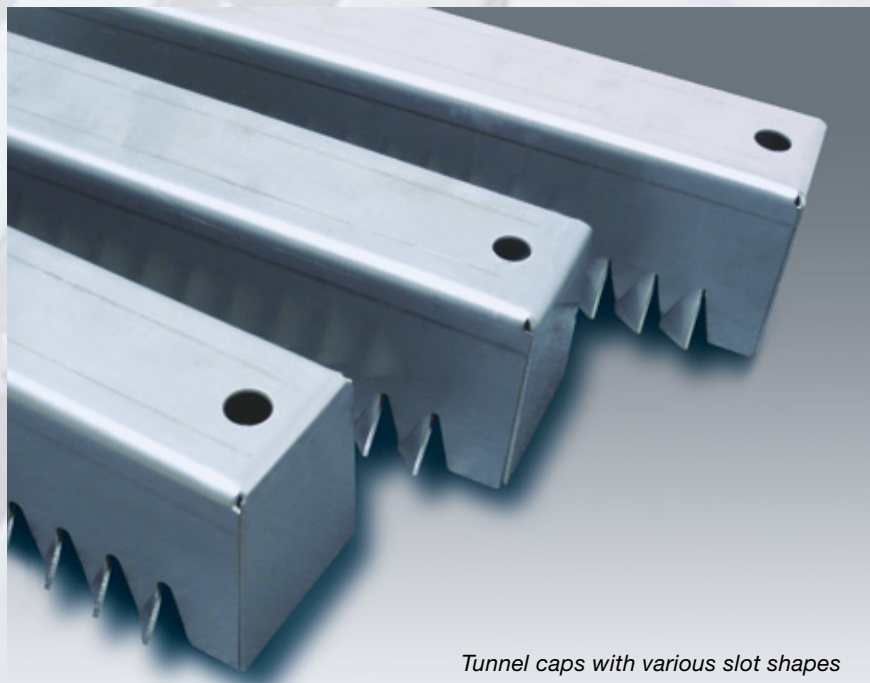
The tunnels of our tunnel trays can be arranged parallel or crosswise to the flow direction. Trays with tunnels crosswise to the flow direction provide long residence times. An increase of the residence time in processes with risk of solids deposition can be realised with both constructions.



*Tunnel tray (dia. 3000mm) with tunnels crosswise to flow direction*

### Tunnel caps

The long vapour chimneys of the tunnel trays are covered by caps. Shape and number of slots in the caps are variable, dependent on the application.



*Tunnel caps with various slot shapes*

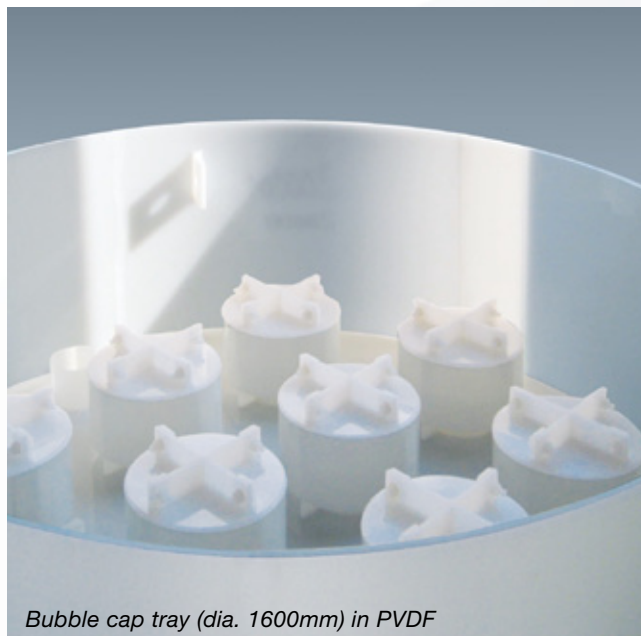
# Plastic trays

## The acid resistant types

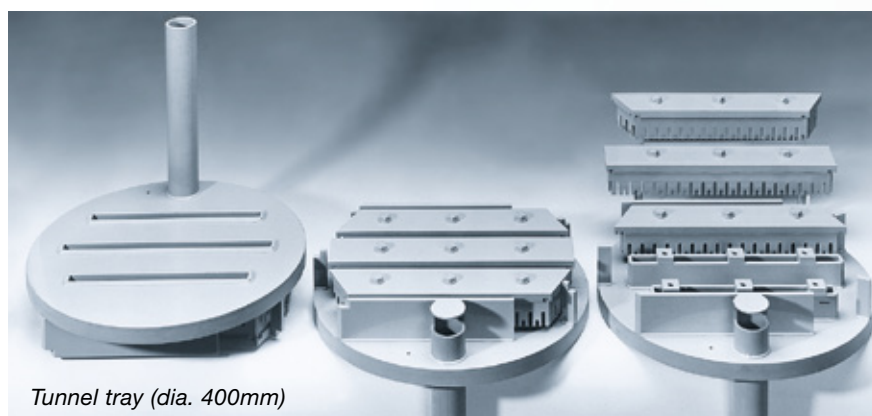
The following tray types are available in thermoplastics:

- sieve trays
- dual flow trays
- bubble cap trays
- tunnel trays

In case of extreme mechanical loads, the plastic trays can be reinforced by CFC-components.



Bubble cap tray (dia. 1600mm) in PVDF



Tunnel tray (dia. 400mm)

### Characteristics of thermoplastic materials in tray applications

Material	Characteristics	Resistant against	Max. operating temperature
<b>PVC</b> (Polyvinylchloride)	hard and stiff thermoplastic, suitable for moderate temperatures	alkalis, acids, salts, oils, fats, benzine, aliphatic hydrocarbons	approx. +60°C/90°C
<b>PE</b> (Polyethylene)	highly stiff material suitable for low temperatures, low water absorption	alkalis, acid, salts, many organic solvents (alcohols, ketones, esters)	approx. +60°C
<b>PP</b> (Polypropylene)	hardness and stiffness greater than PE, poor strength at low temperatures, higher temperature resistance than PE	alkalis, acids, salts, many organic solvents (alcohols, ketones, esters)	approx. +80°C
<b>PVDF</b> (Polyvinylidene fluoride)	fluorine containing themoplastic, good heat and cold resistance	alkalis, acids, salts, many organic solvents (alcohols, ketones, esters) nitric acid, H <sub>2</sub> O <sub>2</sub>	approx. +120°C
<b>PTFE</b> (Polytetrafluorethylene)	excellent temperature resistance, reduced stiffness value high creeping tendency	almost all chemicals	approx. +180°C

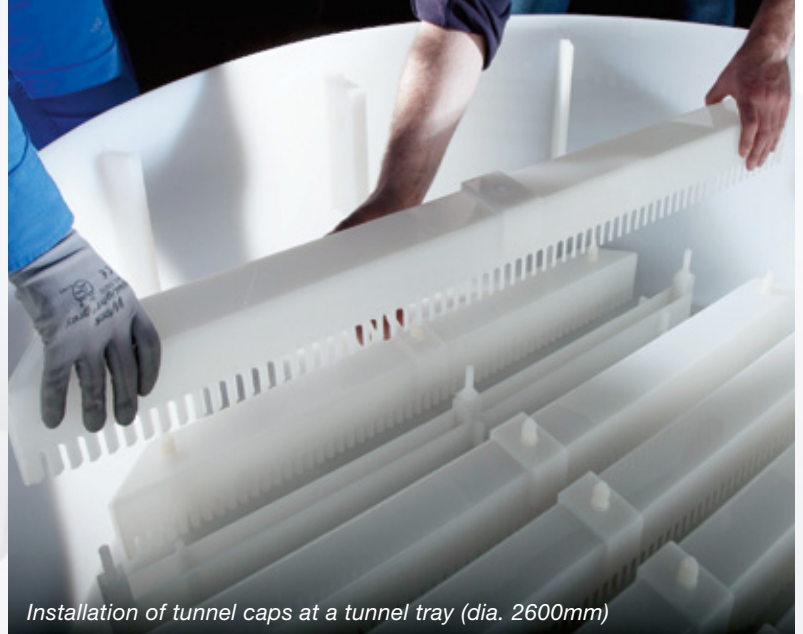


# Plastic tunnel trays

## Plastic tunnel trays

- suitable for lowest liquid loads
- liquid-tight
- preferred type for application in acid recovery

Owing to the self-sealing cartridge construction, minimal liquid loads (approx.  $0.02\text{m}^3/\text{m}^2\text{h}$ ) can be handled at medium gas loads. The trays can be equipped as well with deentrainment devices.



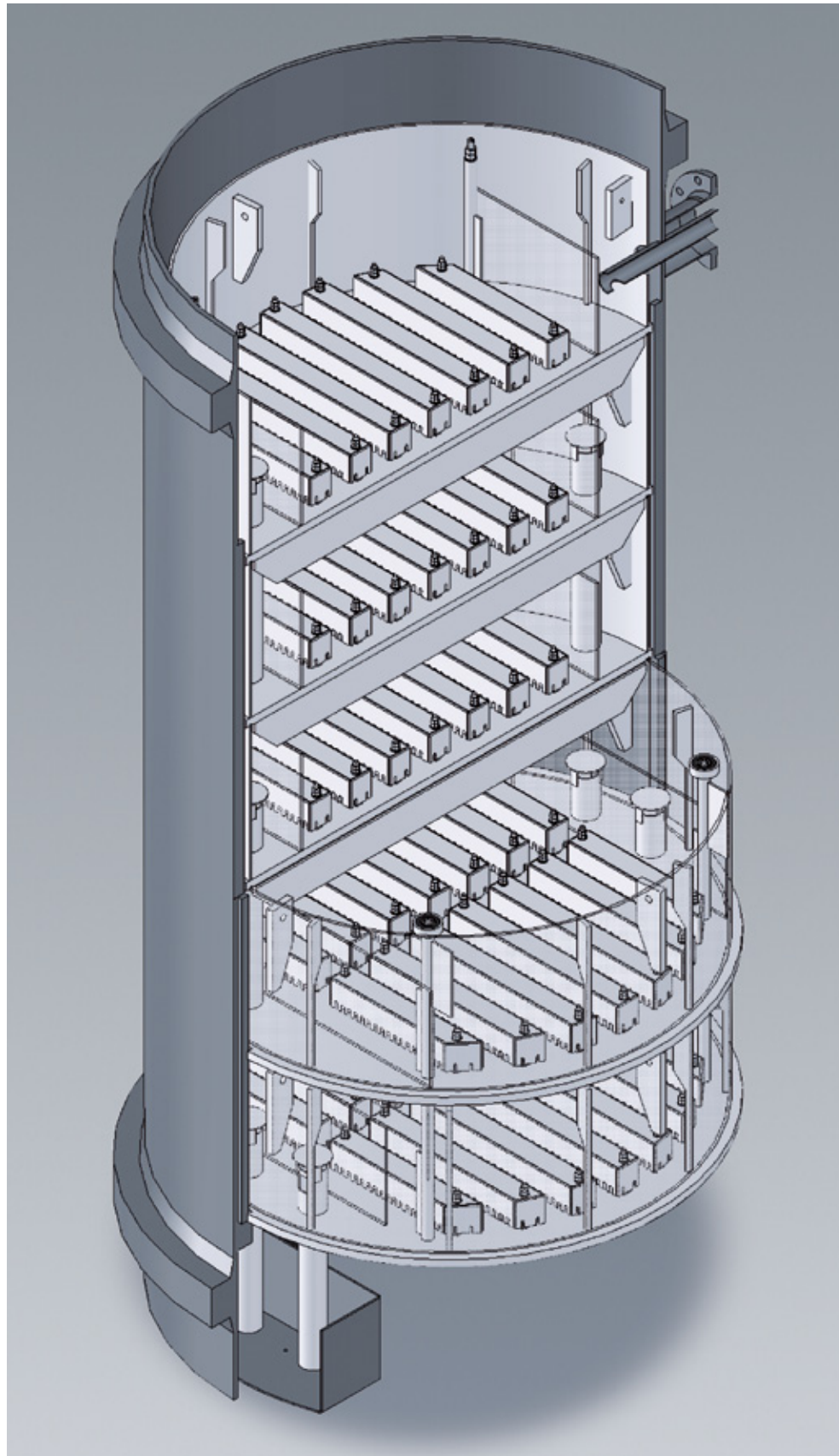
*Installation of tunnel caps at a tunnel tray (dia. 2600mm)*



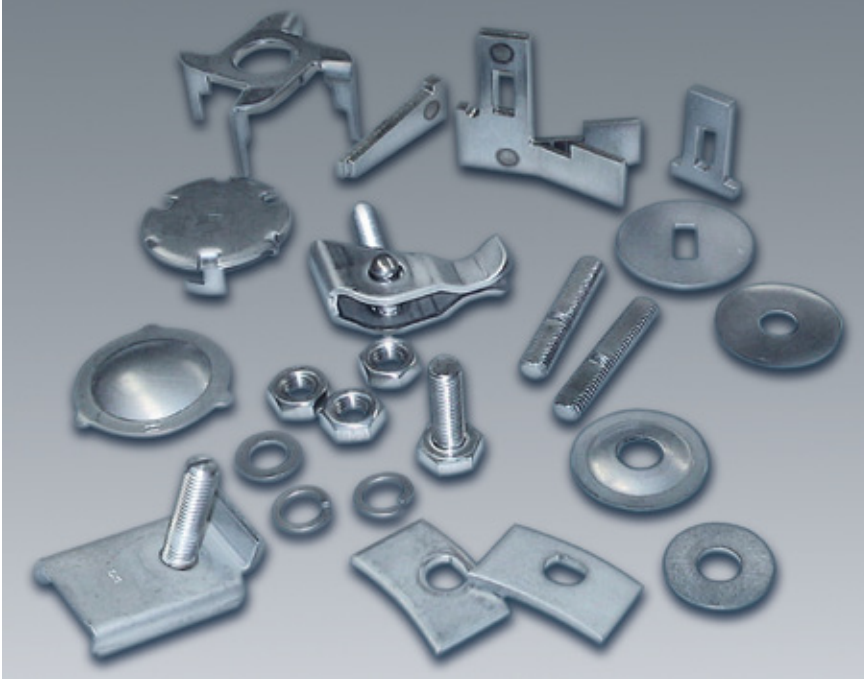
*Tunnel tray (dia. 2600mm) in PPH*

# Complete column with plastic trays

Column with plastic trays:  
the prefabricated sections  
with welded trays can be  
installed through the column  
flange separately or in  
packages.



# Tray hardware



*A collection of tray hardware*

We provide all tray hardware required for tray installation. Commonly used materials and standard types are kept on stock.

# Services

## **Our range of services includes**

- engineering
- construction
- CAD-office (autoCAD, solidworks)
- custom-built equipment
- storage of standard equipment
- delivery of equipment and assistance in case of emergencies
- installation/supervision

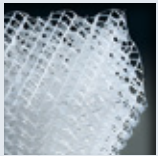


*Installation of trays*

# The way to RVT Process Equipment



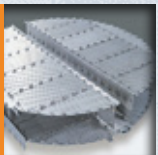
Tower packings for mass and heat transfer



Structured packings for mass and heat transfer



Column internals



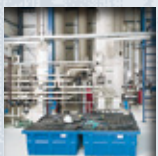
Mass transfer trays



Biological carrier media



Turn-key units for waste gas scrubbing



Ammonia recovery processes



Combustion plants for the disposal of exhaust air, waste gases and liquid media



## Our addresses

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