

# RVT

## High Capacity Solutions



Operating companies nowadays aim to reduce their energy costs and are having higher environmental standards. One way to make progress regarding these goals is to use high-performance equipment for their operations.

RVT High-Capacity Solutions are especially designed to overperform compared to the standard mass transfer equipment.

### High-Capacity Solutions designed to overperform

If a client decides to use this line of products for new columns, data has shown, that RVT's high capacity design solutions enable to reduce vessel diameter, height, or both.

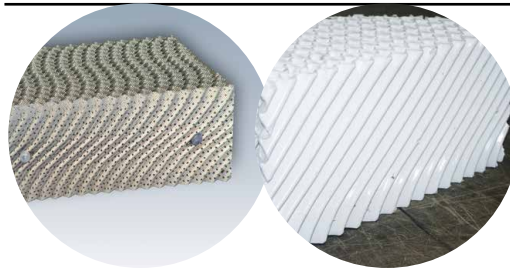
In existing columns on the other hand, high capacity RVT solutions can increase capacities, reduce operating costs, and improve separations.

### Economic rewards in return

Improving column performance using high-performance equipment can lead to significant economic rewards. To improve the performance of a column RVT offers:

- High-Performance Structured Packing: **RMP/RPP SP**, and the **RCP S**
- Latest 4th generation Tower Packing: **RMXR**
- Superior Tray Technology: e.g. **MRV Valve Type**

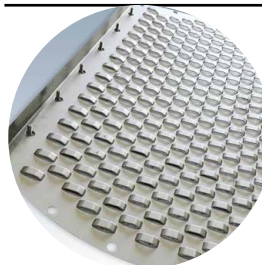
### High-Performance Structured Packing



### 4th Generation Tower Packing



### Superior Tray Technology



*A selection of RVT's High Performance Solutions.*



# RMP/RPP SP

## High Performance Packings

The flow channels of high performance packing types are shaped as an S-line. Therefore they are vertically oriented at the bottom and the top of each packing element.

This leads to a smooth change of the flow direction at the transition area from one element to the next. Therefore capacity is increased and pressure drop is reduced.

### Measurable Advantages

This effect has even been further enhanced with the latest generation of high performance packings, the RMP SP and RPP SP.

With a constant separation performance, this new packing design achieved a significant **15 % increase in capacity** and a substantial **30% reduction in pressure drop** compared to standard high performance packings.

### Cost-saving Design

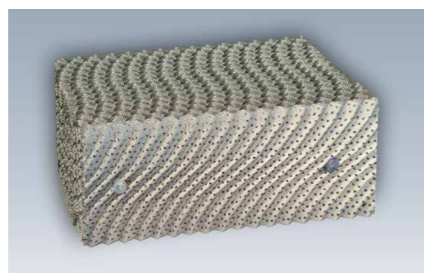
The application of the new High Capacity Packing design RMP SP-line offers considerable advantages.

For new column design, investment costs could be saved substantially by reducing the tower diameters.

In existing towers, throughput can be significantly increased without losing mass transfer efficiency.

RVT offers the high performance packing types S and SP in a range between 125 to 400 m<sup>2</sup>/m<sup>3</sup>.

### High Performance Metal Structured Packing RMP SP 250

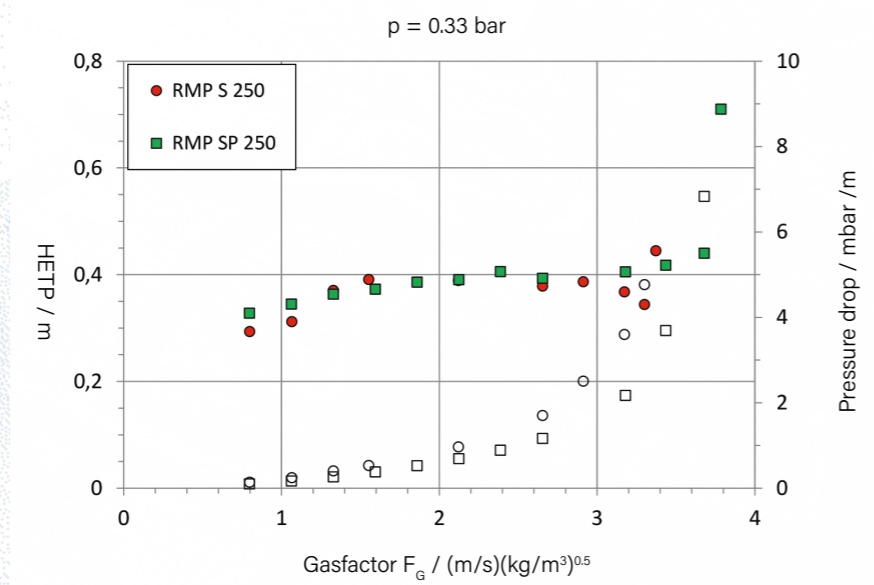


RMP SP 250

Specific surface area	250 m <sup>2</sup> /m <sup>3</sup>
Weight	106 kg/m <sup>3</sup>
Void fraction	98.9 %

RPP SP 250

Specific surface area	250 m <sup>2</sup> /m <sup>3</sup>
Weight	94 kg/m <sup>3</sup>
Void fraction	90.0 %



The standard high performance packing RMP S 250 and the new RMP SP 250 with 250m<sup>2</sup>/m<sup>3</sup> surface area tested by the SRP (Separation Research Program) at the University of Texas, Austin.

# RCP S

## High Performance Packings

The flow channels of high performance packing types are shaped with a variable inclination angle. In consequence they are vertically oriented at the bottom and the top of each packing element.

This leads to a smooth change of the flow direction at the transition area from one element to the next. Therefore capacity is increased and pressure drop is reduced.

### Only available at RVT

Compared to metal or plastic structured packing, the ceramic packing has increased corrosion and temperature resistance performance.

RVT is the only major mass transfer equipment manufacturer to provide high performance structured packing made from ceramics.

### Cost-saving Design

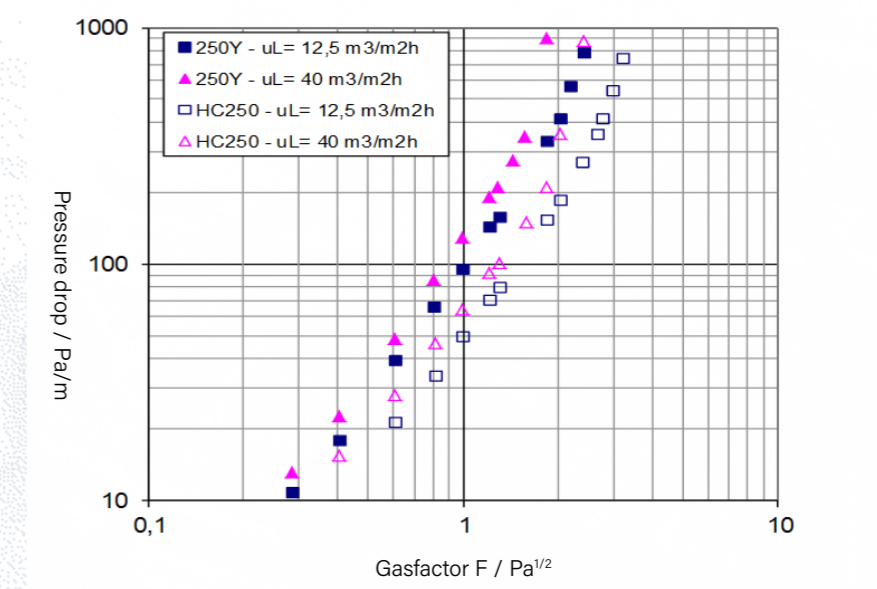
The application of the new High Capacity Packing design RCP S 250 offers considerable advantages.

For new column design, investment costs could be saved substantially by reducing the tower diameters.

In existing towers, throughput can be significantly increased without losing mass transfer efficiency.

RVT offers the high performance packing types S with a surface area of 250m<sup>2</sup>/m<sup>3</sup>.

### High Performance Ceramic Structured Packing RCP S 250



The standard ceramic packing RCP Y and the new RCP S with 250m<sup>2</sup>/m<sup>3</sup> surface area tested by the SRP (Separation Research Program) at the University of Texas, Austin.

# RMXR

## High Performance Packings

The RMXR is the latest development by RVT's random packing engineering team.

It is a patented ring for high performance purposes, exceeding 2nd or 3rd generation rings by up to 25% increased capacity.

### Ring for High Performance Purposes

It can be used as a replacement or your first choice for nearly all of your metal random packing applications.

Using the RMXR allows you to either reduce the diameter for new columns at the same capacity, or keep the diameter for existing and new columns and increase their capacity.

All this can lead to a significant reduction of the energy consumption.

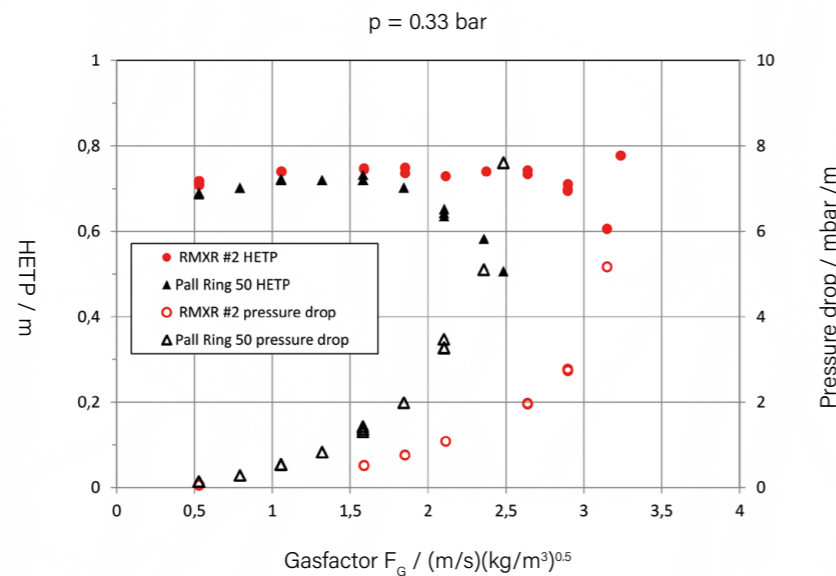
### Cost-saving Design

Available types are the RMXR #2 and #4. Please get in touch with our technical department for recommendations regarding appropriate type and quantity.

With the RMXR #2 and #4 RVT has developed a random packing type with superior design and durability



RMXR #2	
Weight	127 kg/m <sup>3</sup>
Void fraction	98.4 %
RMXR #4	
Weight	79 kg/m <sup>3</sup>
Void fraction	99.0 %



The standard Pall Ring 50 and the RMXR #2 tested by the SRP (Separation Research Program) at the University of Texas, Austin.

# MRV Fixed Valve Tray

## FRI Test Results

### The Test

The MRV fixed Mini-valve was tested at FRI. Two systems C6/C7 (23.5 psia | 1,62 bara; 50 psia | 3,45 bara) and iC4/nC4 (100 psia | 6,89 bara; 165 psia | 11,38 bara) were employed.

All tests were performed with the same tray design in a 4 ft diameter high-pressure column. The column was equipped with 7 mass transfer trays.

That way it was possible to investigate different phenomena caused by the different system properties and evaluate the capacity of the MRV valve itself.

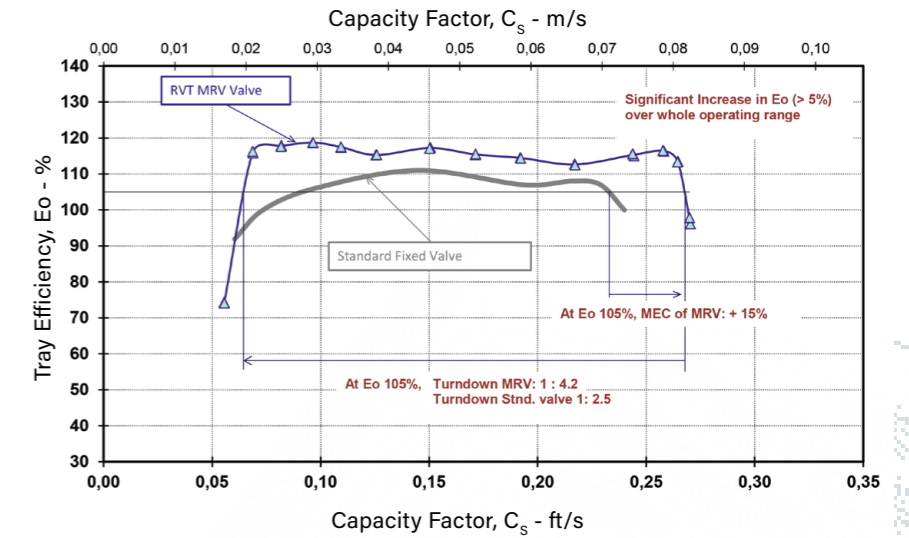
The MRV was tested in a property range for vapor density from 5.5 kg/m<sup>3</sup> | 0.32 lb/ft<sup>3</sup> to 28.9kg/m<sup>3</sup> | 1.79lb/ft<sup>3</sup> and for liquid from 480kg/m<sup>3</sup> | 30.35lb/ft<sup>3</sup> to 630kg/m<sup>3</sup> | 40.0lb/ft<sup>3</sup>.

As usual tests were run under total reflux, top feed and overhead product conditions for all 4 pressures.

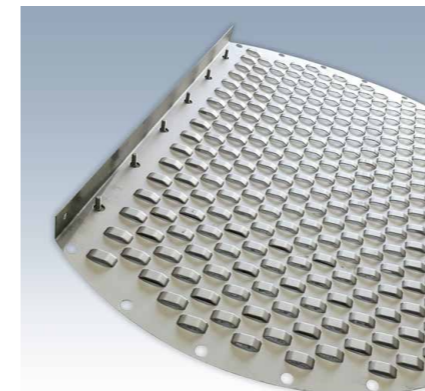
### The Result

The MRV outperformed in all four system tests. Showing that the wide range of high efficiency is an outstanding feature of the MRV valve. The operating range for all four system tests extends from 1:2-3 up to 1:4.2 which has never been reported by similar product tests.

Another interesting aspect is the equality or plateau of the efficiency curve within the operating range. That means the MRV delivers high efficiency all over the entire operating range, which is an advantage of bigger fixed valves or conventional movable valves. In terms of capacity, the MRV valve delivers significantly higher throughput. Looking at the available Jet-flood models for conventional valves, the MRV exceeds the predicted values by up to 25%. In conclusion, the MRV clearly ranks among the best-performing high capacity valves.



The efficiency of an MRV Fixed Valve tested at FRI, iC4/nC4 165 psia (11.4 bara).



The new MRV Fixed Valve Tray with 1.2m diameter.



The MRV mass transfer tray during internal testing procedures.

# The way to RVT Process Equipment



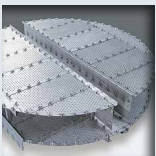
Tower packings for mass and heat transfer



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

RVT Process Equipment GmbH  
Im Gries 15  
96364 Marktrodach  
Germany

Phone +49 (0) 9261 55235-0  
E-Mail [info@rvtpe.de](mailto:info@rvtpe.de)

RVT Process Equipment, Inc.  
9047 Executive Park Drive  
Suite 222  
Knoxville, TN 37923, USA

Phone +1 (865) 694-2089  
E-Mail [info@rvtpe.net](mailto:info@rvtpe.net)

Kunshan  
RVT Process Equipment Co., Ltd  
No. 66 - 68, Shaojing Road  
Development Zone Kunshan  
Kunshan, Jiangsu 215300  
P.R. China

Phone +86 (512) 55 18 82 52  
E-Mail [postmaster@chinarvtpe.cn](mailto:postmaster@chinarvtpe.cn)