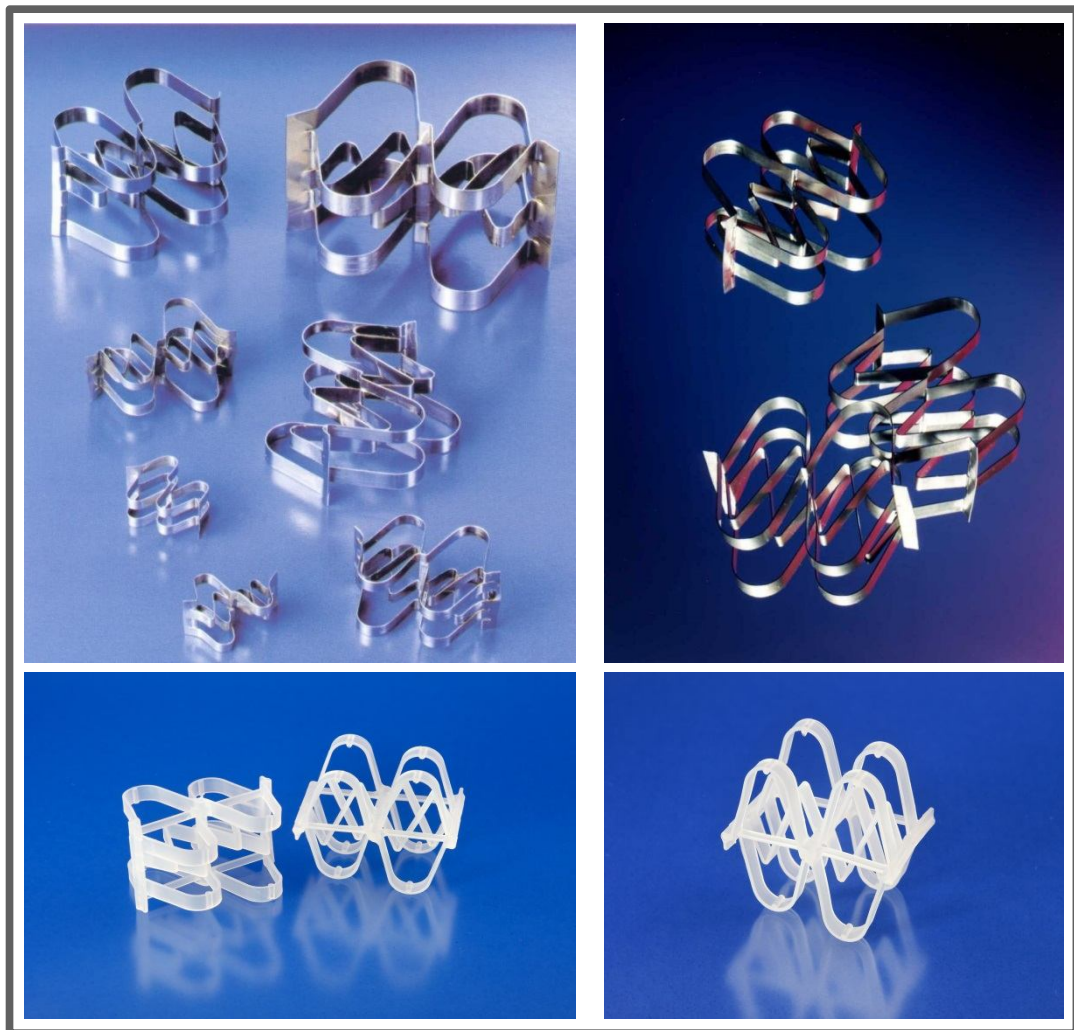




Raschig USA Inc.®

# Raschig Super Rings®

*High-performance, free-flowing random metal and plastic packing for scrubber and stripper applications.*



**Product Technical Bulletin 625**

# Raschig Super-Rings®

## Mass transfer

Effective mass transfer between phases demands not only a large interfacial area but also the most turbulent possible flow conditions and frequent renewal of the phase interfaces. A packed bed of Raschig Super-Rings® produces numerous thin films of liquid in turbulent flow. These are formed on the sinusoidal webs and are constantly intermixed as the result of the recurrent contact points within each packing piece.

## Performance data of the Raschig Super-Rings®

Empirical studies have confirmed the above comments. The following Figures show the pressure drop of the Raschig Super-Rings® as a function of the gas capacity factor at various liquid loads. As a result of a very open structure of Raschig Super-Rings® the pressure drop of dry packing is significantly lower than that of dry 50 mm (~2") metal Pall Rings. This difference increases as a function of liquid load. Also Raschig Super-Rings® has substantially lower pressure drop than other 50 mm metal packings.

The loading capacity of the Raschig Super-Rings® is presented in the following Figures. Raschig Super-Rings® has a higher loading capacity versus 50 mm metal Pall Rings. Additionally Raschig Super-Rings® has significantly higher loading capacity versus other packings.

Also presented are data of absorption of ammonia from air into water. The separation efficiency of Raschig Super-Rings® is up to 14% better than that of 50 mm metal Pall Rings or other similar metal packing choices.

Furthermore the low mass per unit volume of Raschig Super-Rings® allows for lower cost supporting elements in a column. And Raschig Super-Rings® achieves less mass per cubic foot without sacrificing stability. Empirical studies have shown that packed depth of 15 m (~50 ft) is practical. This is the result of the alternating wave design of the metal webs of Raschig Super-Rings®.

Additionally this alternating wave structure prevents entanglement / bridging of the individual packing pieces within a packed bed thus guaranteeing problem-free assembly and dismantling of a tower. Raschig Super-Rings® is also suitable for liquids contaminated with solids as the result of its open structure. Table 1 presents the technical data of Raschig Super-Rings®.



# Raschig Super-Ring®

The alternating wave structure prevents entanglement / bridging of individual packing pieces. This assures problem free assembly and dismantling of a tower. Owing to its open structure Raschig Super-Rings® is also suitable for liquids bearing heavy solids loading. Tables 1 and 2 present the technical data of metal and plastic Raschig Super-Rings®.

Table 1: Technical data of metal Raschig Super-Rings®

Size	0.1	0.3	0.5	0.6	0.7	1	1.5	2	3	4
Pieces /ft <sup>3</sup>	14,300	5,100	4,110	2,100	1,290	910	340	270	122	110
Weight lbm/ft <sup>3</sup>	20	14	17	15	15	14	11	10	9	8
Surface Area ft <sup>2</sup> /ft <sup>3</sup>	138	96	76	66	55	46	37	31	24	21
Void %	95	96	97	98	98	98	98	98	98	98

Table 2: Technical data of plastic Raschig Super-Rings®

Size	0.6	2	3
Number of Pieces / ft <sup>3</sup>	1,530	255	113
Geometric Surface Area ft <sup>2</sup> /ft <sup>3</sup>	63	31	23
Void %	93	96	97



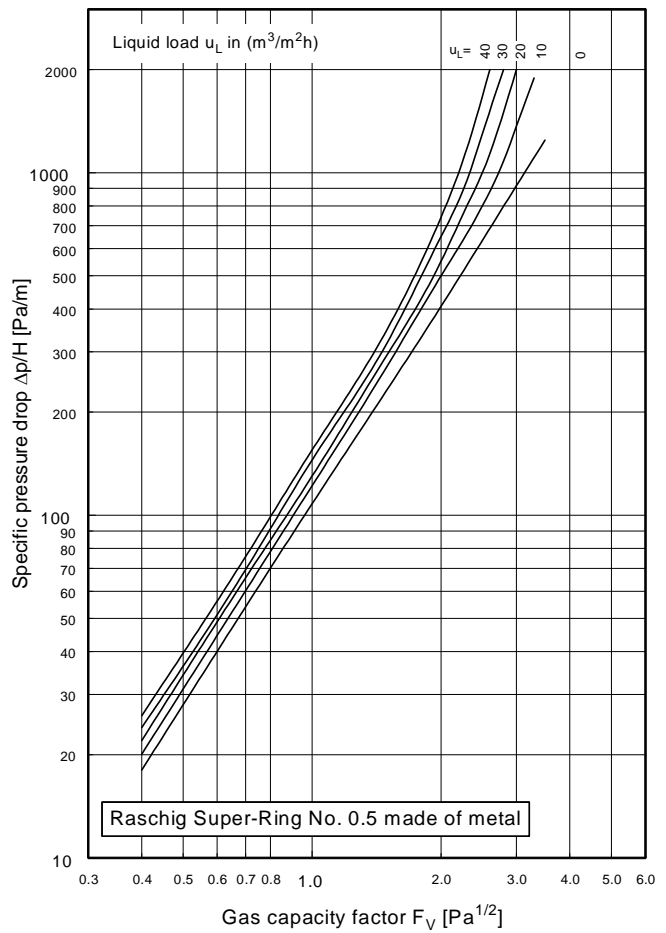
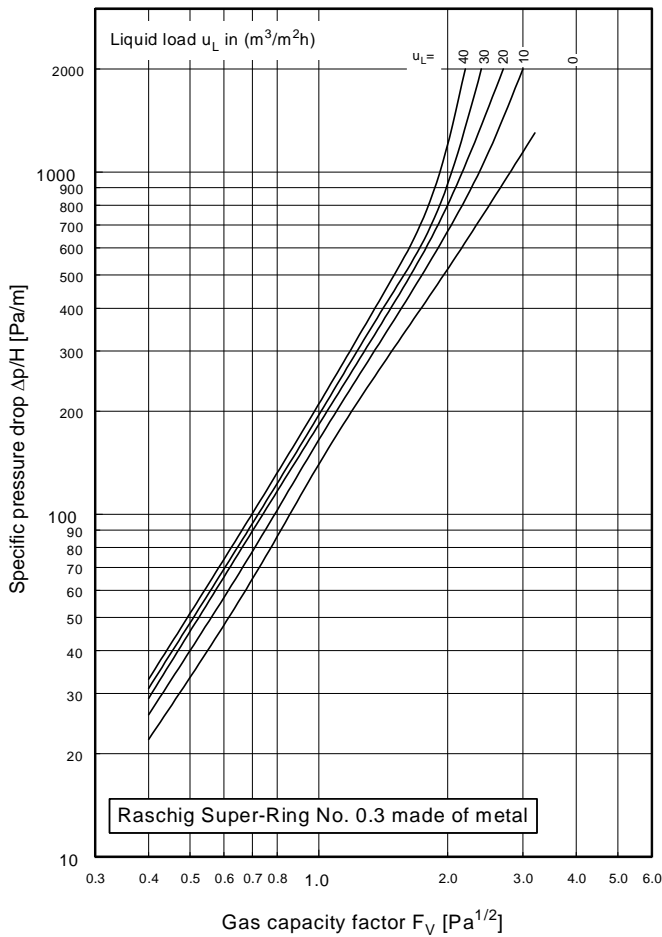
# Pressure drop of metal RASCHIG SUPER-RINGS® system: air/water

## RASCHIG SUPER-RINGS® No. 0.3

Column diameter: 0.288 m  
Packing height: 1.0 m

## RASCHIG SUPER-RINGS® No. 0.5

Column diameter: 0.288 m  
Packing height: 1.0 m



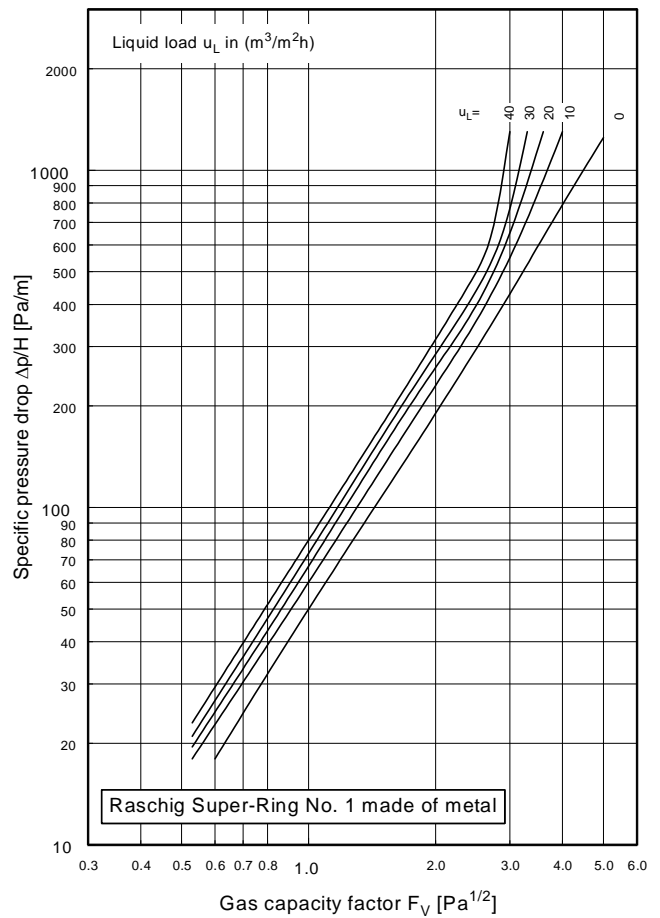
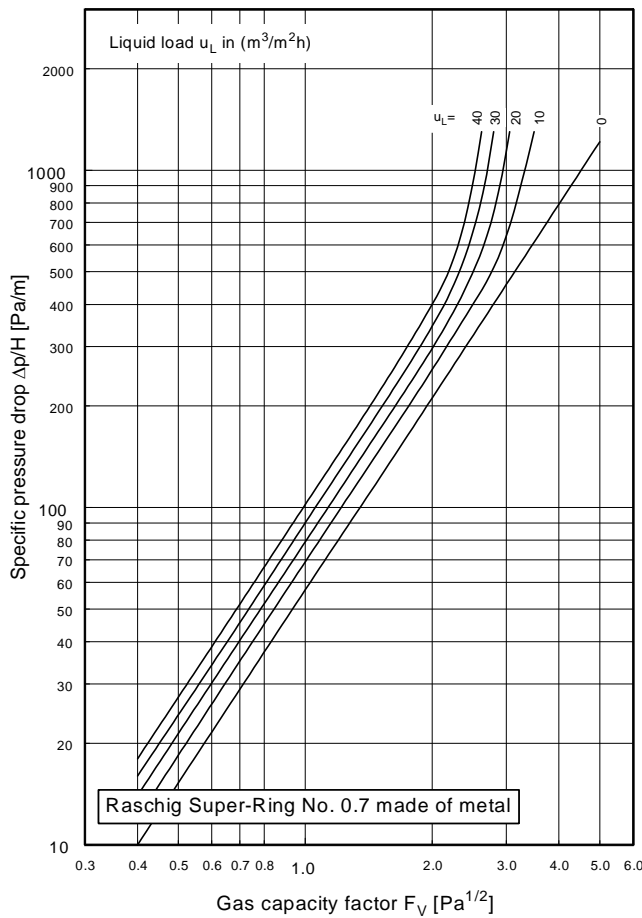
# Pressure drop of metal RASCHIG SUPER-RINGS® system: air/water

## RASCHIG SUPER-RINGS® No. 0.7

Column diameter: 0.288 m  
Packing height: 2.0 m

## RASCHIG SUPER-RINGS® No. 1

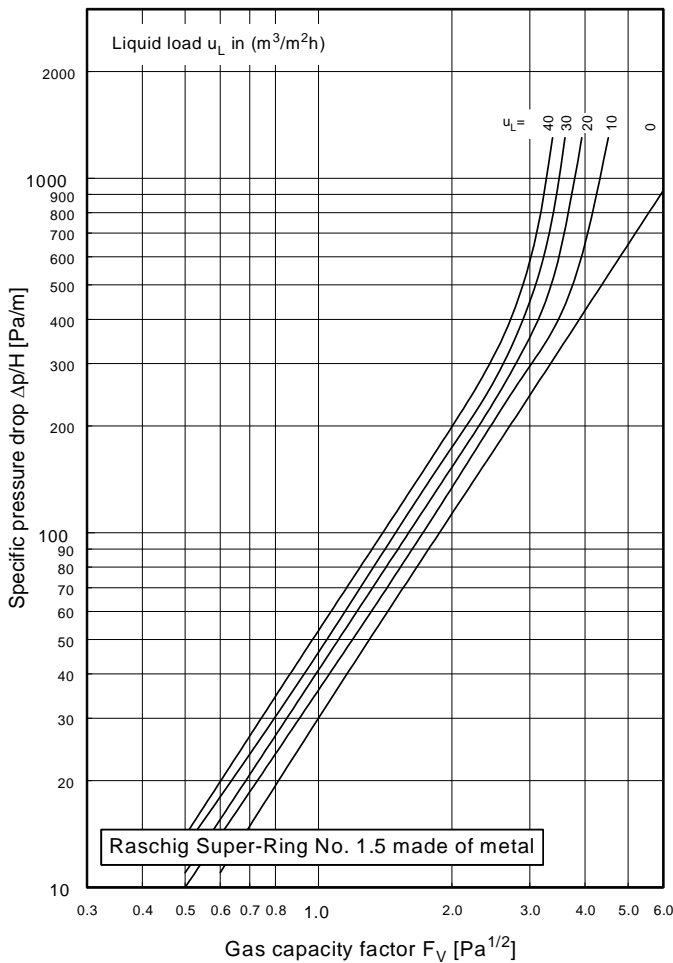
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Packing height: 2.0 m



# Pressure drop of metal RASCHIG SUPER-RINGS® system: air/water

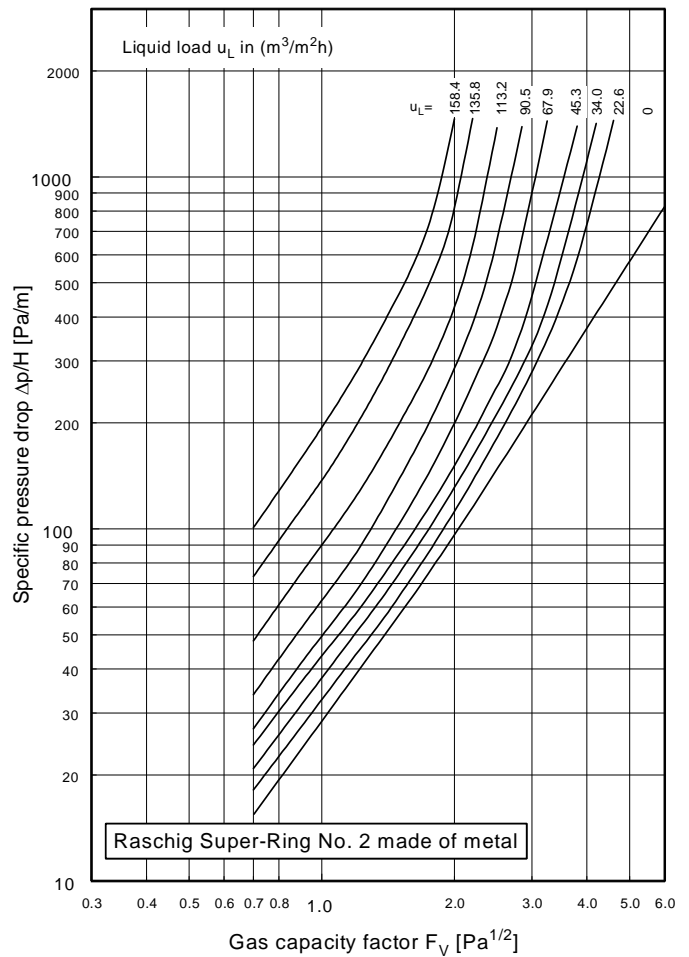
## RASCHIG SUPER-RINGS® No. 1.5

Column diameter: 0.288 m  
Packing height: 2.0 m



## RASCHIG SUPER-RINGS® No. 2

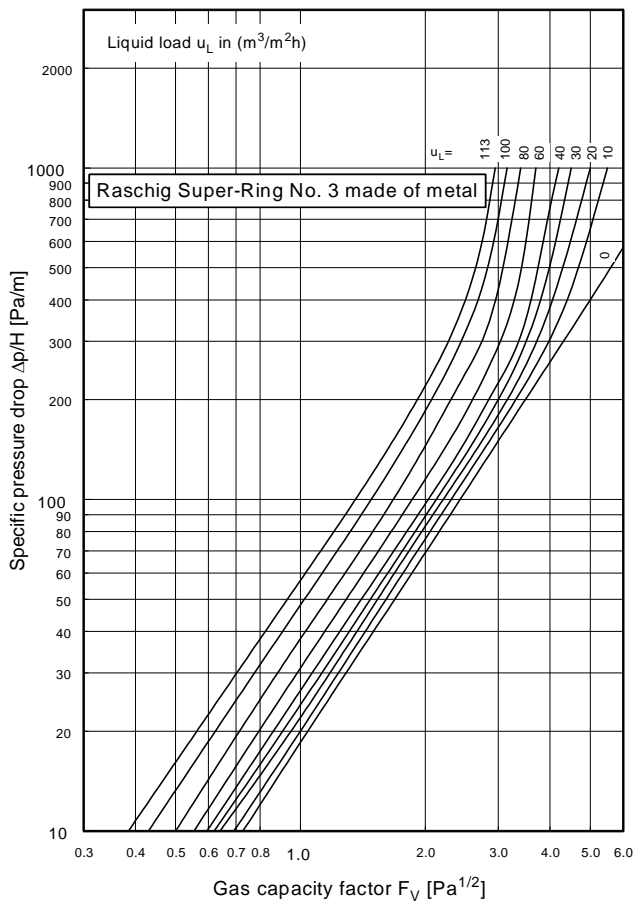
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Packing height: 3.0 m



# Pressure drop of metal RASCHIG SUPER-RINGS system: air/water

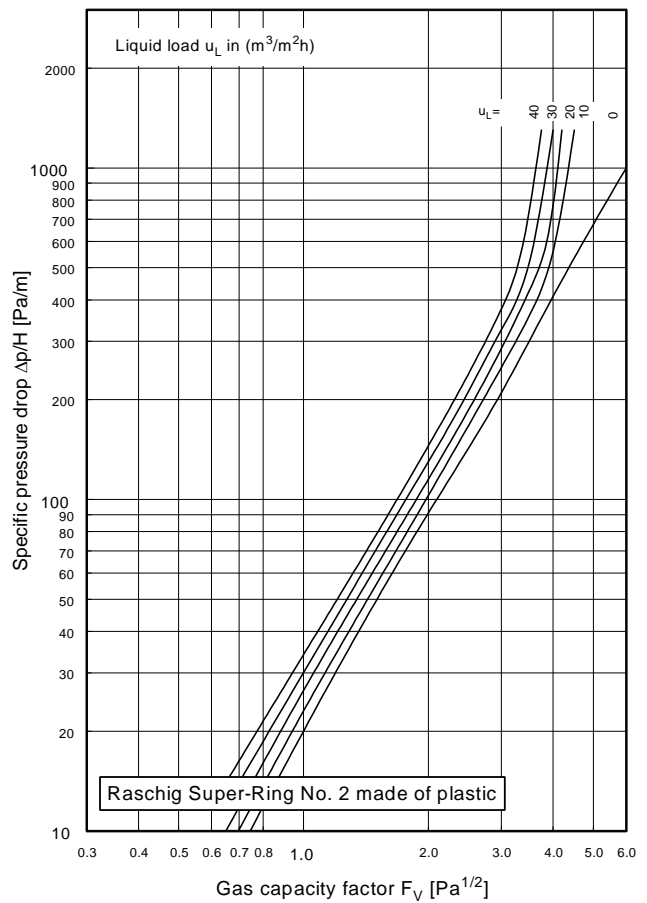
## RASCHIG SUPER-RINGS® No. 3

Column diameter: 0.440 m  
Packing height: 2.0 m



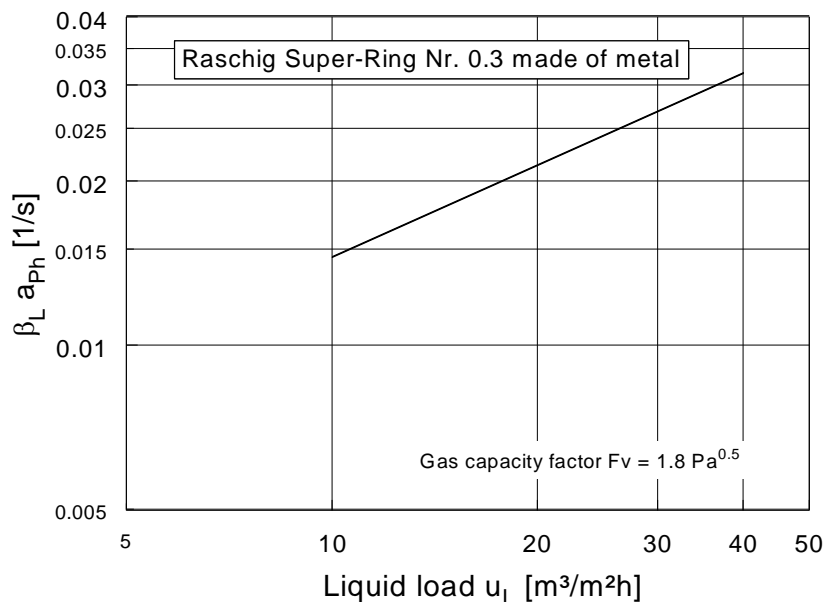
## RASCHIG SUPER-RINGS® No. 2

Column diameter: 0.288 m  
Packing height: 2.0 m



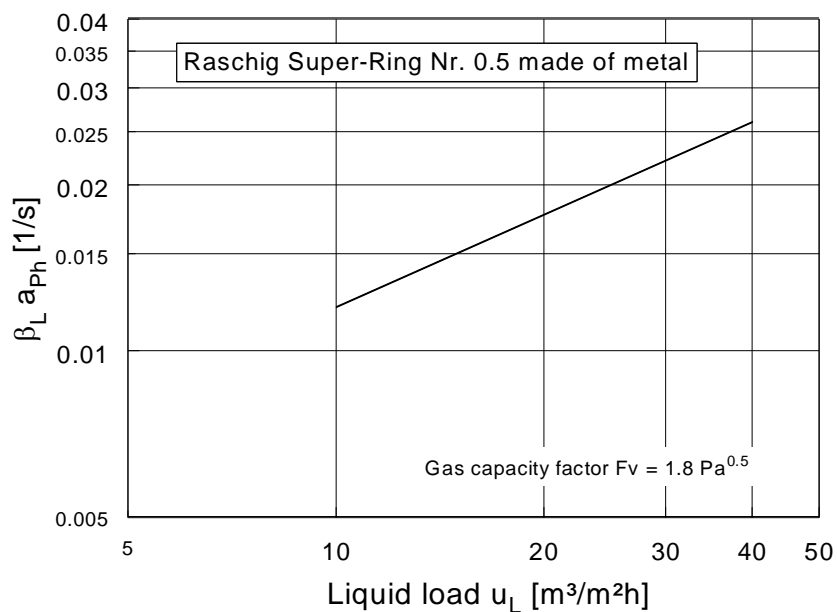
# Transfer efficiency of metal RASCHIG SUPER-RINGS®

in the desorption of CO<sub>2</sub> from water into an atmospheric  
air-stream



## RASCHIG SUPER-RINGS® No. 0.3

Column diameter: 0.288 m  
Packing height: 1.0 m



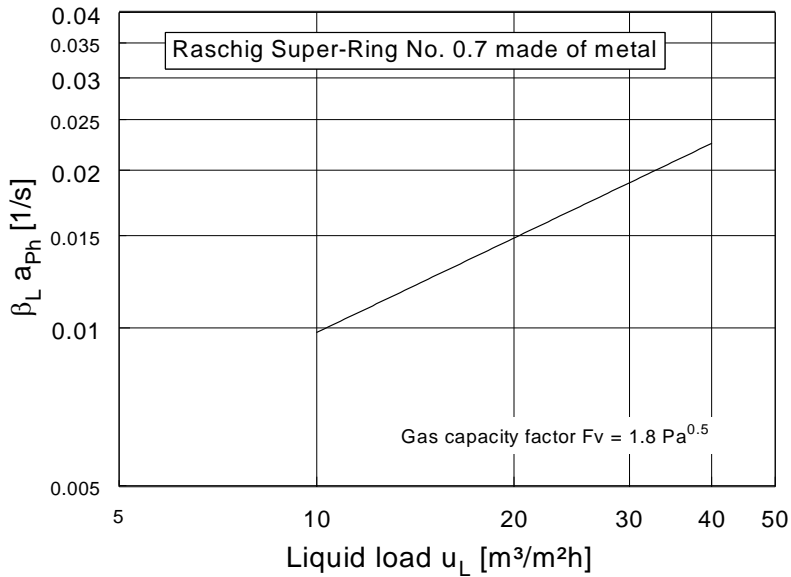
## RASCHIG SUPER-RINGS® No. 0.5

Column diameter: 0.288 m  
Packing height: 1.0 m



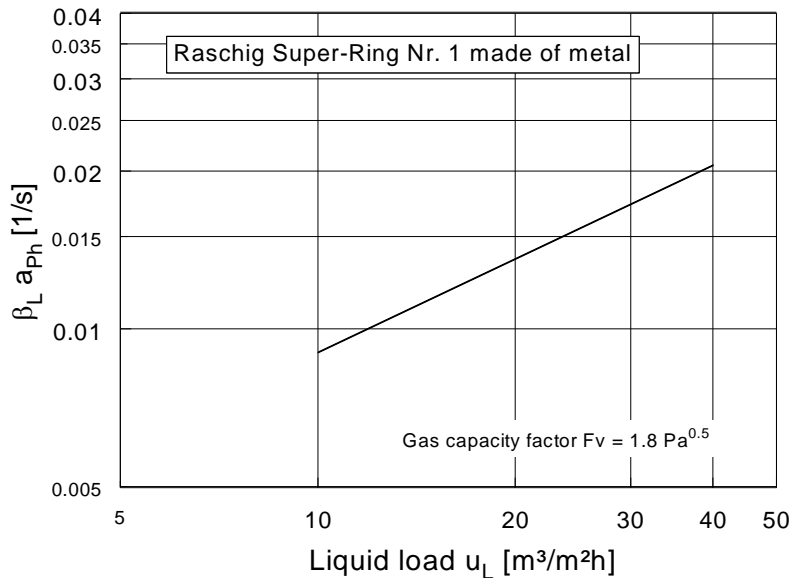
# Transfer efficiency of metal RASCHIG SUPER-RINGS®

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Column diameter: 0.288 m  
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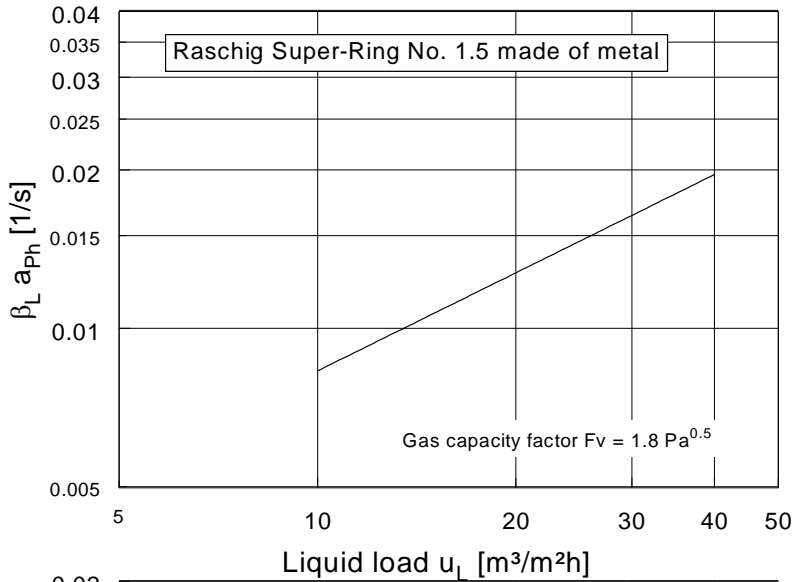


## RASCHIG SUPER-RINGS® No. 1

Column diameter: 0.288 m  
Packing height: 2.0 m

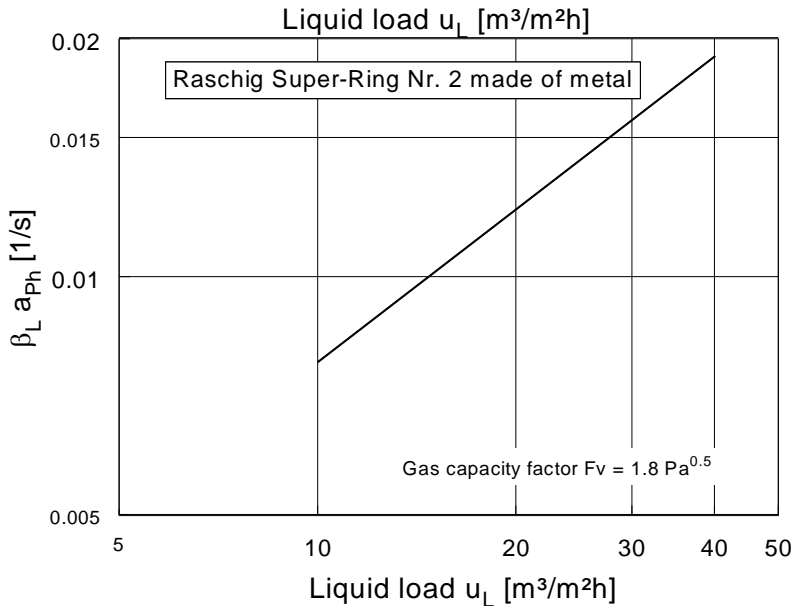
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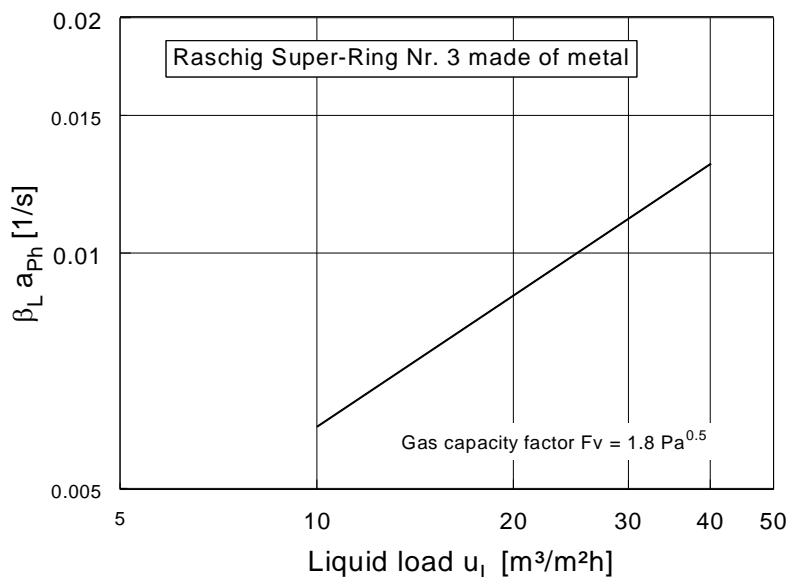


## RASCHIG SUPER-RINGS® No. 2

Column diameter: 0.288 m  
Packing height: 2.0 m

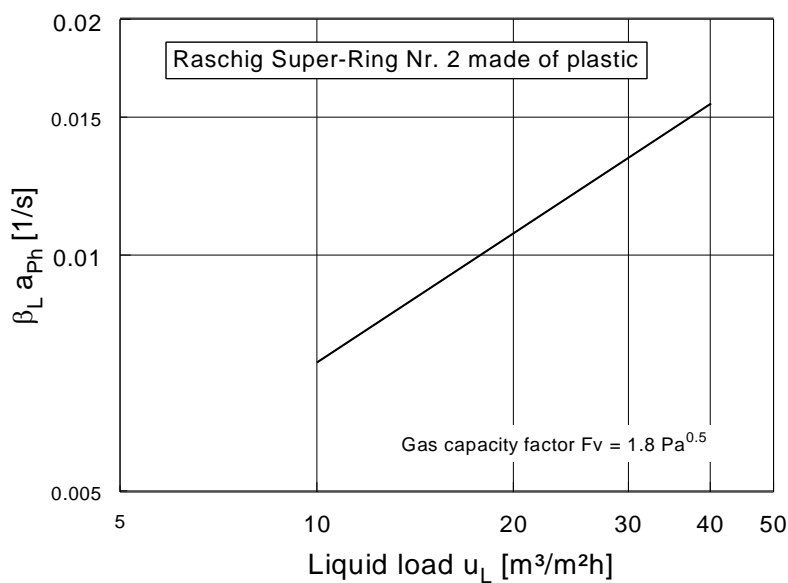
# Transfer efficiency of metal RASCHIG SUPER-RINGS®

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## RASCHIG SUPER-RINGS® No. 3

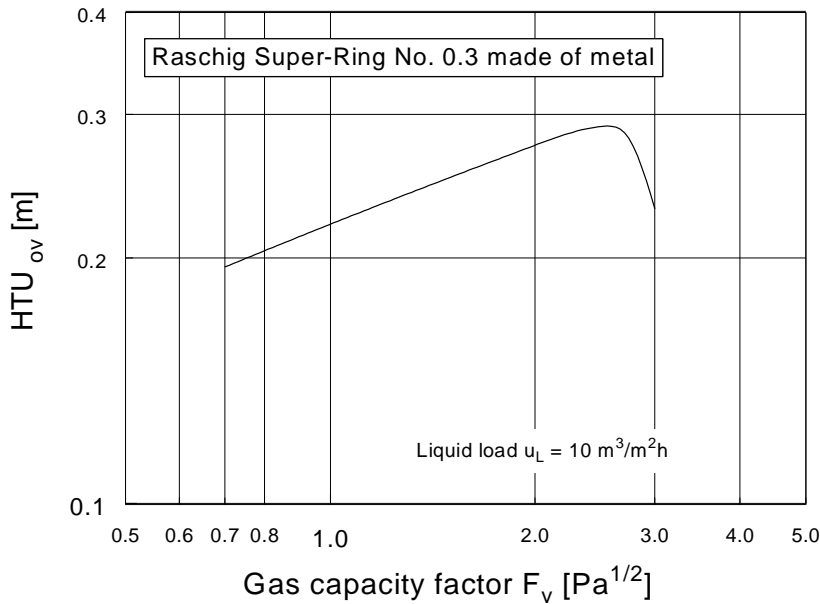
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Packing height: 1.0 m



## RASCHIG SUPER-RINGS® No. 2

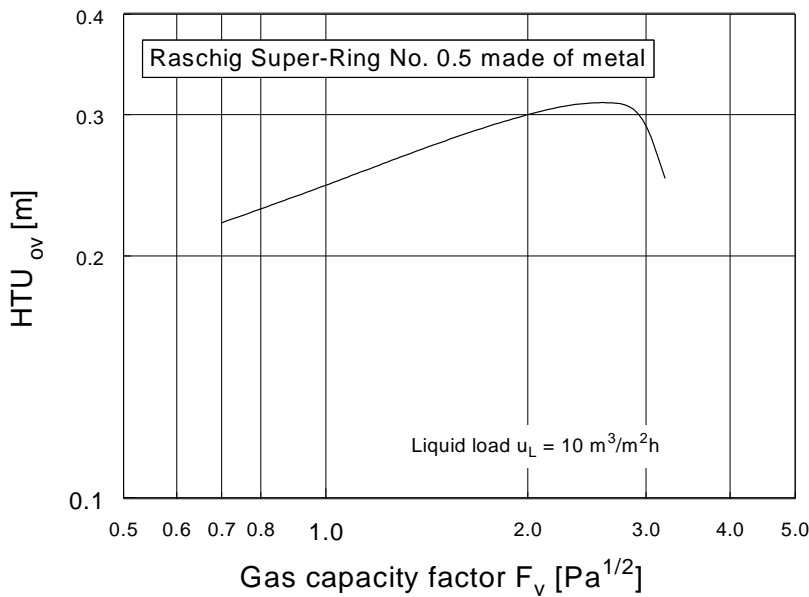
Column diameter: 0.288 m  
Packing height: 2.0 m

# Height of a transfer unit $HTU_{ov}$ for metal **RASCHIG SUPER-RINGS®** for the absorption of $NH_3$ from air in water in the gaseous phase



**RASCHIG SUPER-RINGS® No. 0.3**

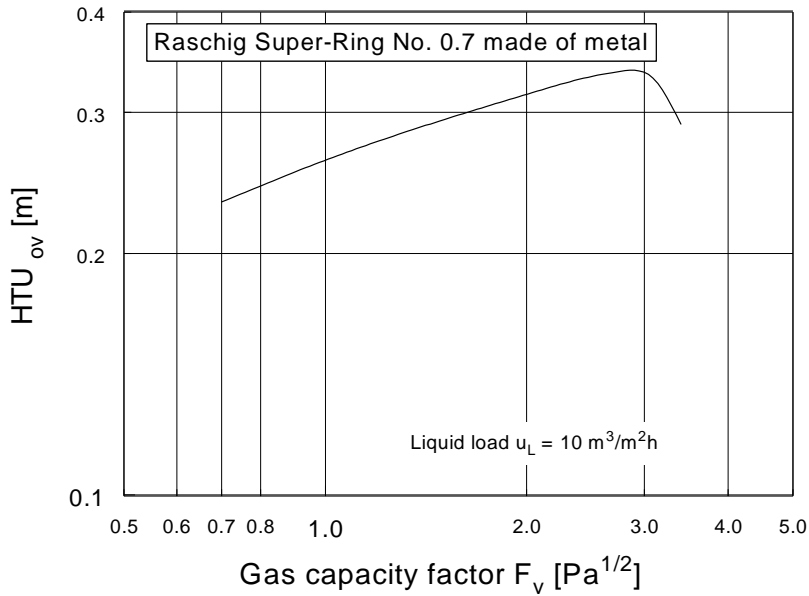
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Packing height: 1.0 m



**RASCHIG SUPER-RINGS® No. 0.5**

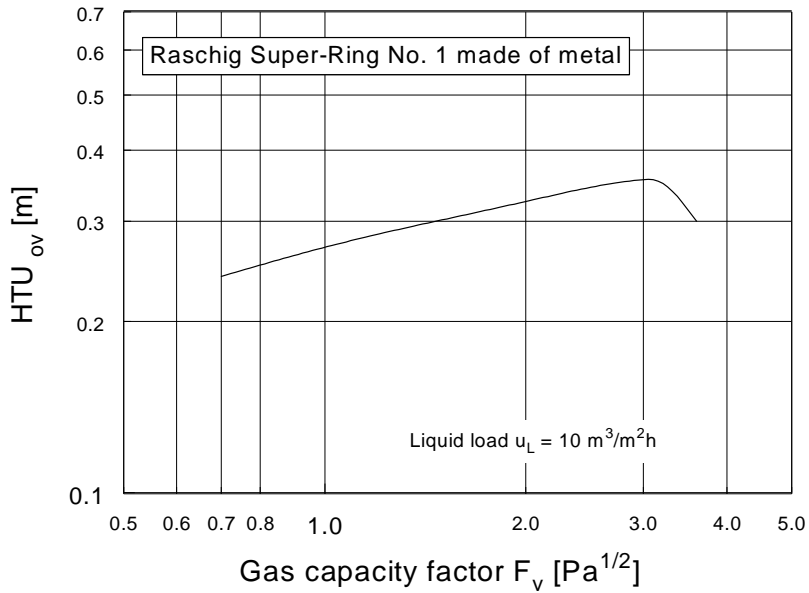
Column diameter: 0.288 m  
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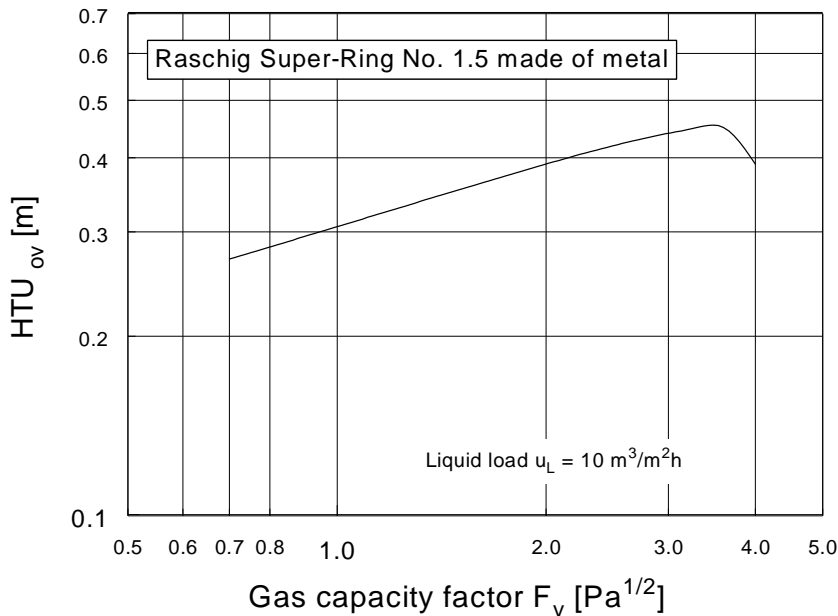


## **RASCHIG SUPER-RINGS® No. 1**

Column diameter: 0.288 m  
Packing height: 2.0 m

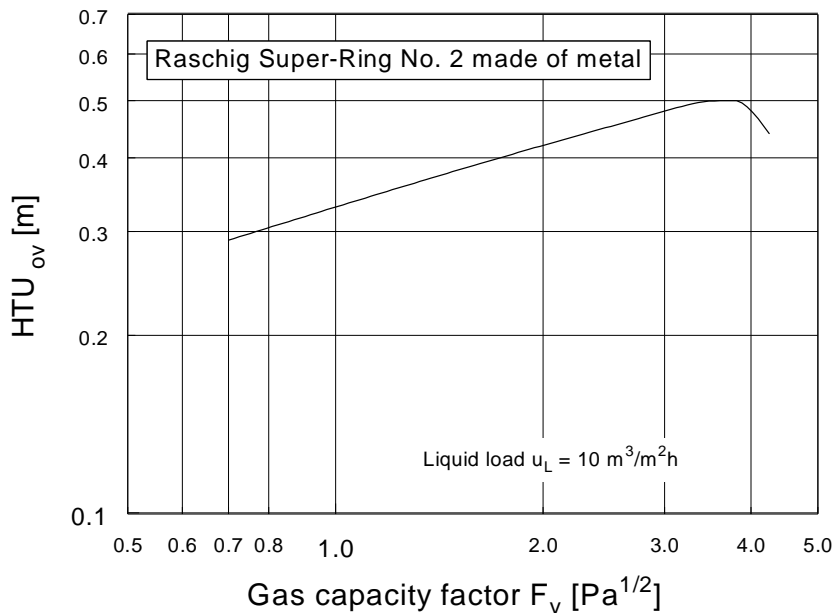


# Height of a transfer unit $HTU_{ov}$ for metal **RASCHIG SUPER-RINGS®** for the absorption of $NH_3$ from air in water in the gaseous phase



**RASCHIG SUPER-RINGS® No. 1.5**

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Packing height: 2.0 m

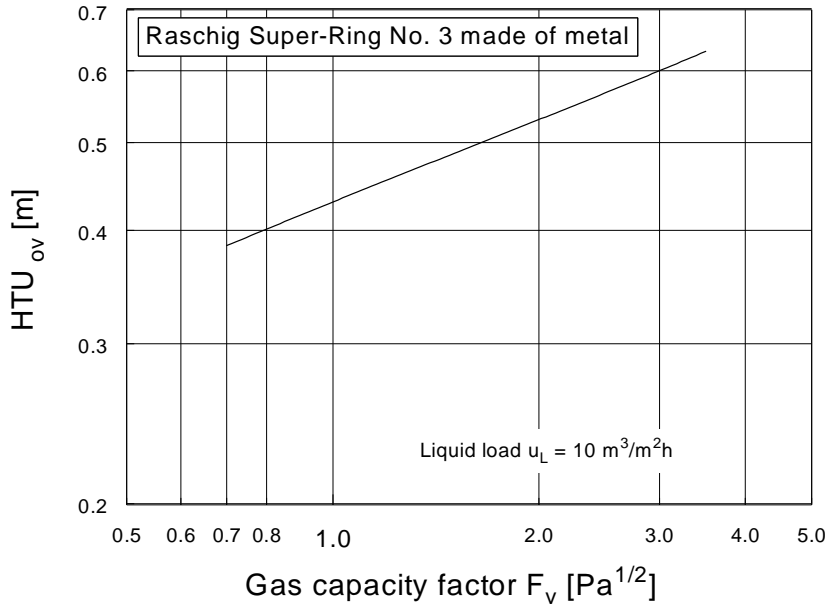


**RASCHIG SUPER-RINGS® No. 2**

Column diameter: 0.288 m  
Packing height: 2.0 m

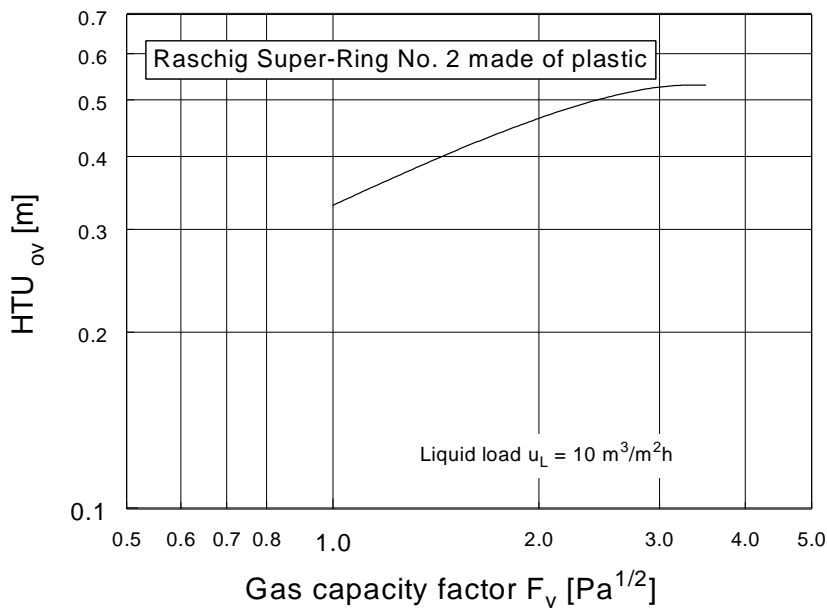


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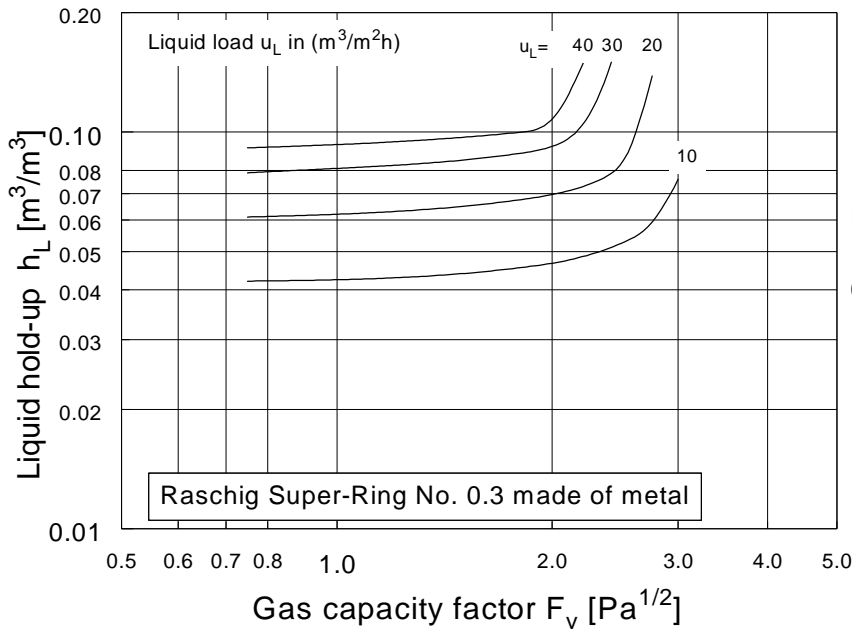


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Packing height: 2.0 m

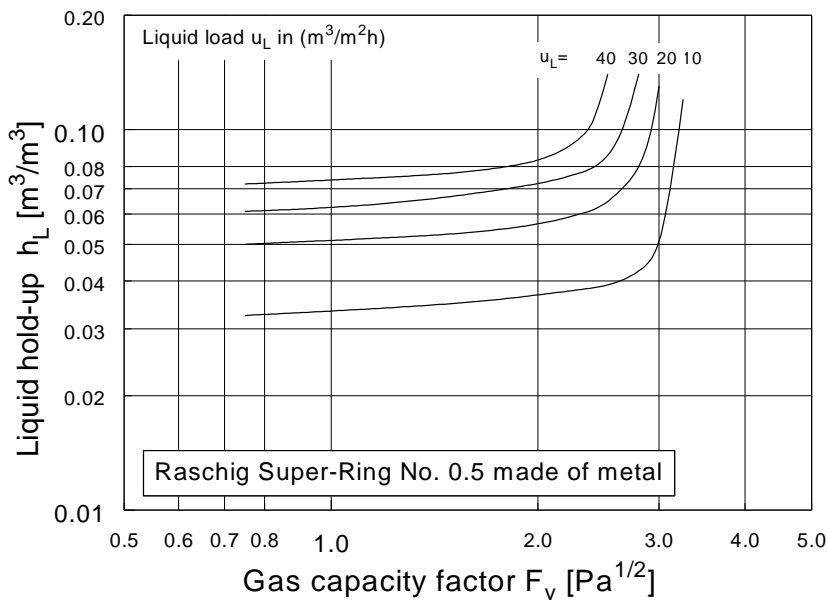


# Liquid hold-up in columns with metal RASCHIG SUPER-RINGS® system: air/water



**RASCHIG SUPER-RINGS® No. 0.3**

Column diameter: 0.288 m  
Packing height: 1.0 m



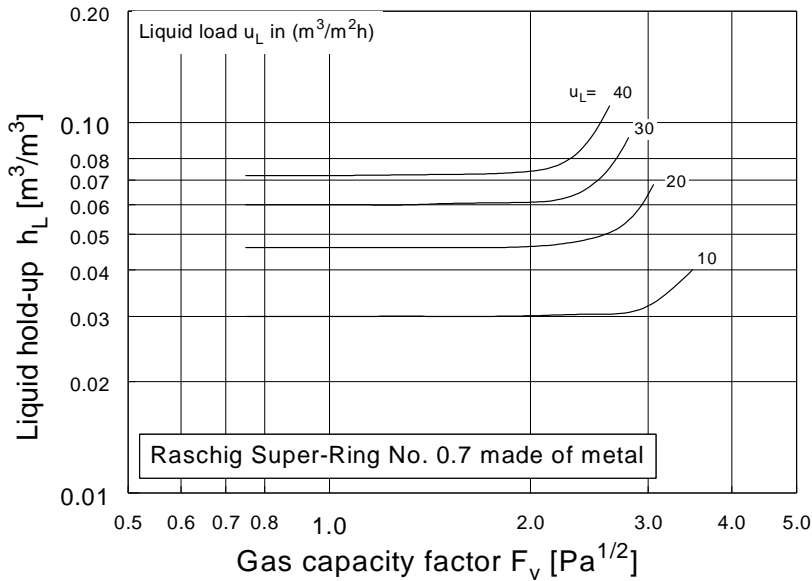
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Column diameter: 0.288 m  
Packing height: 1.0 m



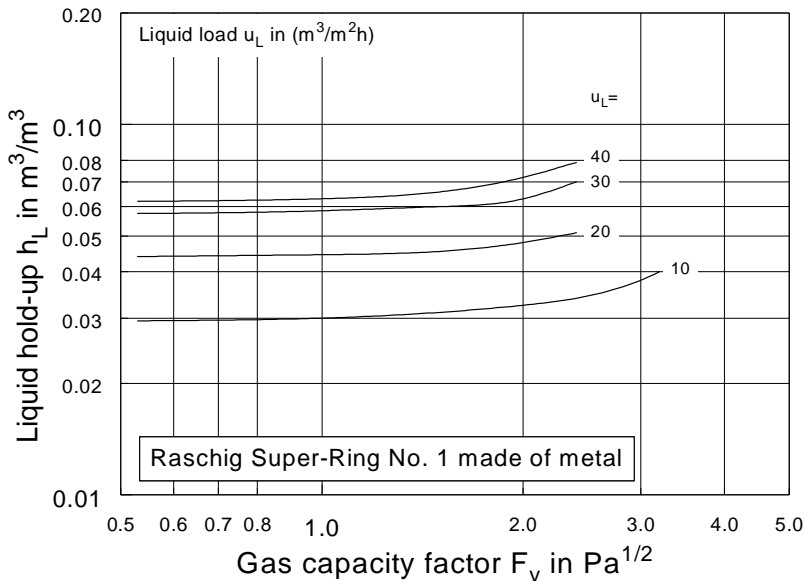


# Liquid hold-up in columns with metal **RASCHIG SUPER-RINGS®** system: air/water



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Column diameter: 0.288 m  
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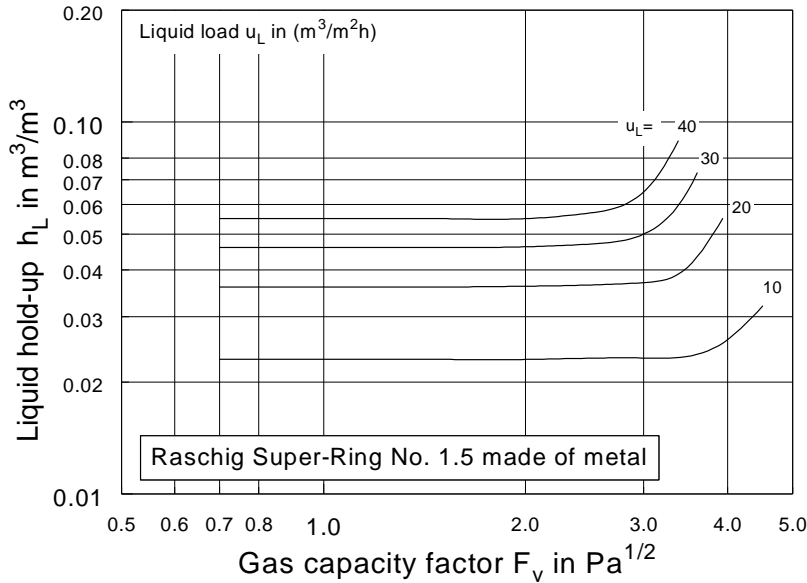


**RASCHIG SUPER-RINGS® No. 1**

Column diameter: 0.288 m  
Packing height: 2.0 m

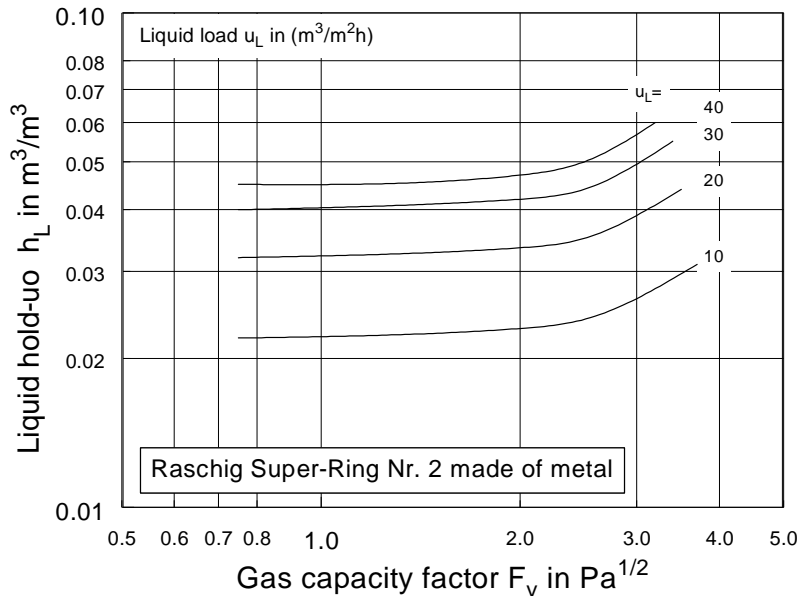


# Liquid hold-up in columns with metal **RASCHIG SUPER-RINGS®** system: air/water



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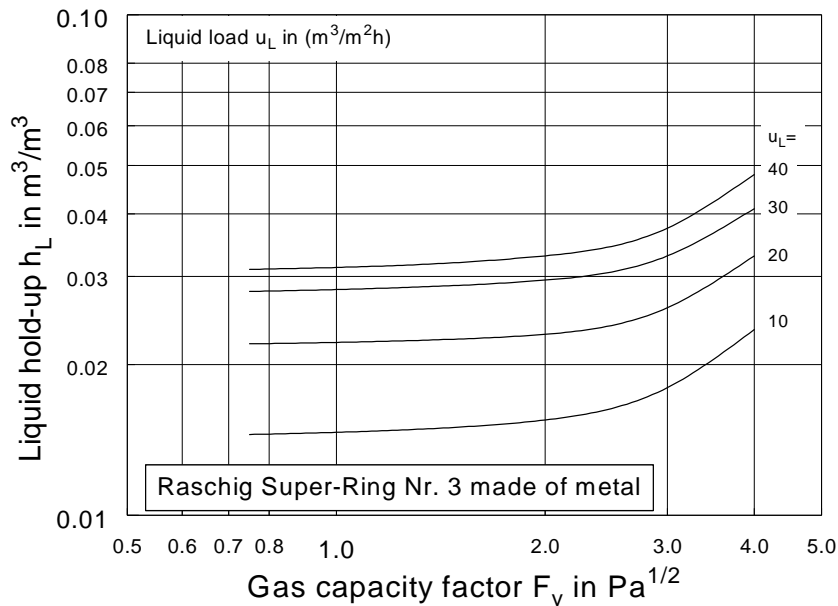
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Packing height: 2.0 m



**RASCHIG SUPER-RINGS® No. 2**

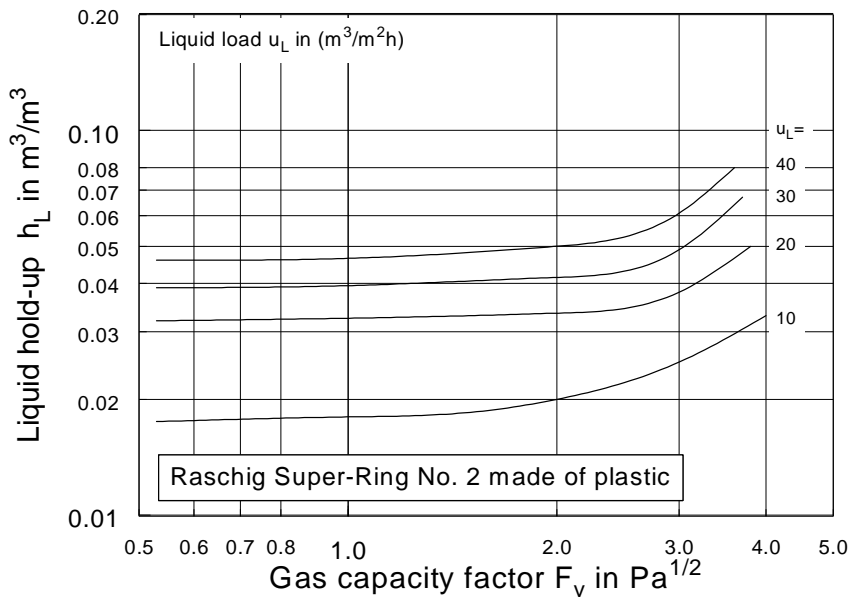
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Column diameter: 0.288 m  
Packing height: 2.0 m



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Column diameter: 0.288 m  
Packing height: 2.0 m



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200 Metal Random – RSR	625 Plastic Random – RSR
300 Mist Eliminators – Wire Mesh	650 Plastic Random – LPR
400 Fractionation Trays and Hardware	675 Plastic Random – Nor Pak
450 High Capacity – Nye Trays	700 Plastic Random – Rings and Saddles
475 High Capacity – CoFlo Trays	800 Ceramic Random Packing
500 Metal Structured Packing – RSR	900 Winsorp Software
525 Metal Structured Packing – MaxPak	1000 Process Information
550 Plastic Structured Packing – RSP	1100 Column Internals
	1200 Reactor Internals

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