RANDOM PACKINGS MADE OF METAL

VFF tower packings have been used worldwide for many decades in a large variety of absorption, desorption, distillation and extraction processes, including applications in gas purification, water treatment and product purification.

A wide range of all important packing shapes and sizes are manufactured in the VFF production facilities. Raw materials and manufacturing are subject to continual, strict controls within the framework of the VFF operational quality assurance and external counterchecks.

In column filling, a cone shape and a high compaction of the tower packings is to be avoided, any filling of the packings should take place on a wide, stable support plate.

Upon request, VFF will conduct a theoretical calculation of the column basic design based on the disclosing of the operational conditions.

This concerns the hydraulics and mass transfer, whereby VFF has chosen the optimal packing. For this, please see page e.g. 12 and 40.

With the VFF packing software, the column basic design can be calculated on a theoretical basis, including column diameter, bed height etc.

Cylindrical Ring
- 15-50 mm

Pall®-Ring
- 15, 25, 38, 50, 80, 90 mm

VSP®
- 25, 40, 50 mm

Interpack®
- Nr. 1, 2, 3

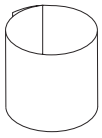
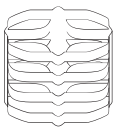
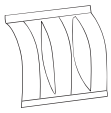
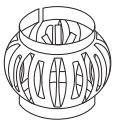
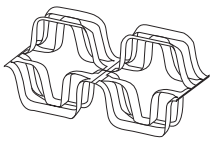
Top-Pak®
- Nr. 2

Novalox®-M
- 15, 25, 40, 50, 60, 70 mm

Description	Remarks / Comparison to Other Packings
Cyl. Ring	Cylindrical Ring: the simplest packing shape
Pall®-Ring	Approved for years, standard packing; applicable for all separation processes; approved properties for pressure drop, packing height, good mechanical stability and moderate pollution susceptibility.
VSP®	High performance tower packing; compared to Pall®-Ring: lower pressure drop without increase in packing height
Interpack®	Patent Rein-Linde; for small quantities, lower price than Pall®-Ring; comparable properties to Pall®-Ring
Top-Pak®	As a result of the spherical shape, the liquid distribution is more uniform, even with lower irrigation density and higher packing height, beneficial, moderate pollution susceptibility and simpler draining from the column even in a heavily polluted condition; favorable degree of separation with low pressure drop.
Novalox®-M	A metal tower packing saddle with good mass transfer
VFF-Twin-Pak®	VFF Patent. A modern high-performance metal tower packing with best mass transfer and extremely low pressure drop (see page 20)
Special shapes	Upon request and in coordination with the VFF customer

RANDOM PACKINGS MADE OF METAL

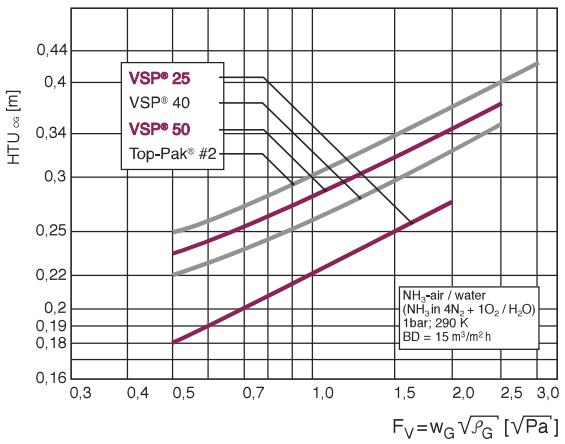
Physical properties

Description	Nominal size	Spec. weight* [kg/m³]	Spec. surface [m²/m³]	Free volume [%]
Cylindrical Ring 	15 mm	380	360	95
	25 mm	360	210	95
	38 mm	250	136	96
	50 mm	190	105	97
Pall®-Ring	15 mm	380	360	95
	25 mm	360	210	95
	38 mm	250	136	96
	50 mm	190	105	97
	80 mm	200	80	96
	90 mm	185	65	98
VSP® 	25 mm	180	205	98
	40 mm	170	132	98
	50 mm	190	110	98
Interpack® 	#1 (10 mm)	600	620	92
	#2 (15 mm)	360	360	96
	#3 (20 mm)	380	260	96
Top-Pak® 	#2	160	80	98
Novalox®-M	15 mm	360	290	96
	25 mm	340	230	97
	40 mm	230	150	98
	50 mm	160	100	98
	60 mm	140	85	98
	70 mm	120	60	98
VFF-Twin-Pak® 	No. 1	200	200	97
	No. 1,25	170	160	98
	No. 1,5	150	135	98
	No. 2	150	100	98
	No. 3	140	80	98

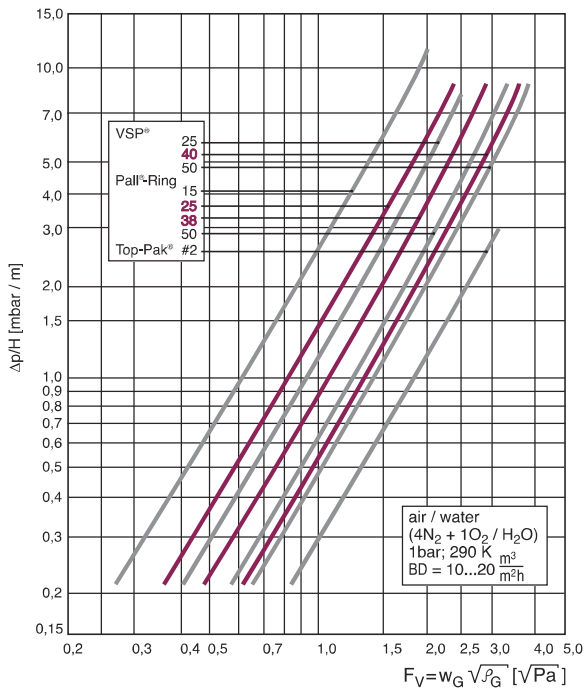
Additional sizes upon request

* for 1.4301 and standard wall thickness

Height of one Transfer Unit (HTU)



Pressure drop



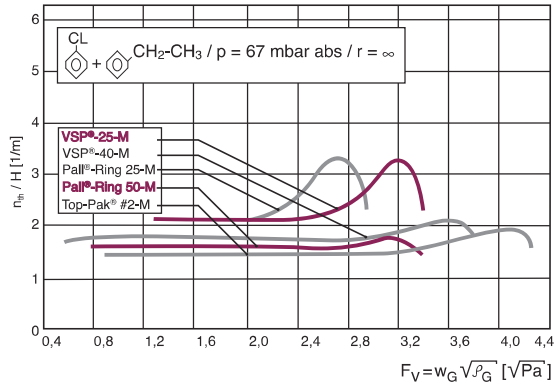
Information for process engineering

Parameter	Remarks
D : d	> 10 : 1
F	F = F(D/d); Fmax = 1,12
BV	BV = F * H * $(D/2)^2 * \pi$
Hmin	1
Hmax (1 Bed)	5*D ... 10*D, max ca. 10 m
Fv	0,2 ... 4
BD	3 ... > 100
Δp/H	0,1 ... 10
FF	20 ... 80 (a)
Hold-up	10 ... 150
HTU	0,1 ... 1 (b)
nth / H	1,5 ... 2,5 (b)

Abbreviations:

BD [m³/(m²*h)]:	Irrigation load
BV [m³]:	Tower packing's ordering volume
D [mm]:	Column diameter
d [mm]:	Random Packing's nominal size
F [-]:	Factor for the calc. of BV incl. the compulsory volume supplement (-> data sheet: TB01)
FF [%]:	Flooding factor
Fv [(m/s) * $\sqrt{kg/m^3}$]:	Gas loading factor
H [m]:	Bed height of the Random Packings
Hold-up [L/m³]:	Liquid hold up
HTU [m]:	Height of one transition unit
min/max:	Minimum / maximum
nth/H [1/m]:	Separation factor per unit height
Δp/H [mbar/m]:	Specific pressure drop
(a): FF>65%:	Please use multi beam support plate
(b):	Please consider minimum requirements for liquid or gas distributor and evt. aerosol problems.

Separation efficiency



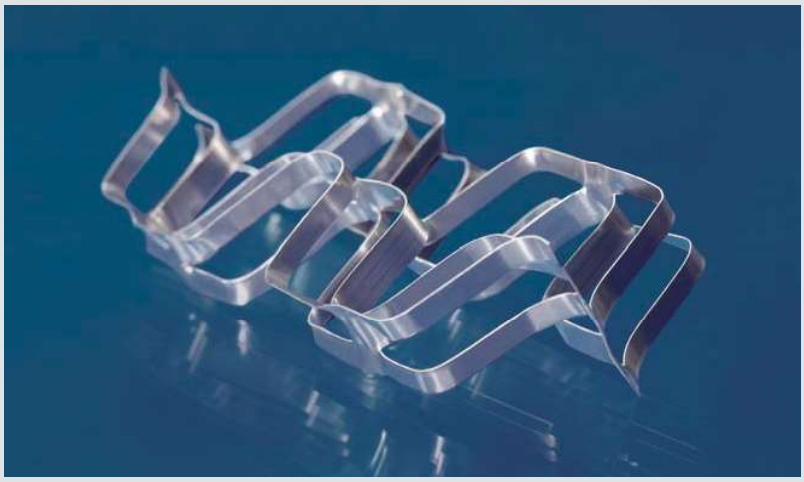
Materials for VFF-Random Packings made of metal

- Carbon steel
- Stainless steel
- Aluminum
- Hastelloy
- Incoloy
- Inconel
- Copper
- Nickel
- Monel
- and others

VFF-Twin-Pak®

New Random Packing made of metal

The VFF-Twin-Pak®, a VFF-patent, is an entirely newly developed high-performance metal tower packing with a profile that comes close to the structured packings, while not doing without the numerous advantages of a tower packing. Its form combines an extremely low pressure drop with a convincing mass transfer!



The VFF-Twin-Pak® is a high-performance tower packing, predestined for highest capacity. The mass transfer of the new VFF-Twin-Pak® is superior to that of a proven tower packing of an equivalent nominal size.

The specific pressure drop of the VFF-Twin-Pak® is much lower than that of the comparable tower packing.

In other words: The VFF-Twin-Pak® offers highest capacity while clearly saving costs!

By means of the new manufacturing method developed by VFF and its special design, the VFF-Twin-Pak® can convince by a high degree of design-related mechanical stability. This allows the trouble-free realization of a great filling height in a single bed at a low weight.

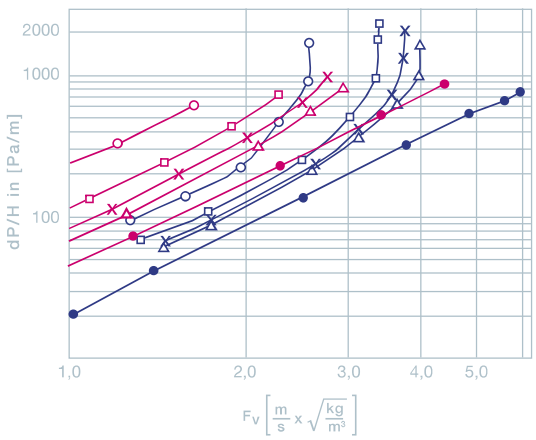
When the VFF-Twin-Pak® was designed, priority was placed on the demands of the VFF customers on a high-performance tower packing. Therefore, when it came to the manufacturing method, attention was paid that the customer is provided with a tower packing individually tailored to his requirements.

The VFF-Twin-Pak® is not only offered in a generally applicable standard version, but also with a multitude of options in regards to material or wall thicknesses. Whether as a featherweight or extremely strong version, whether carbon steel or special alloys – with the VFF-Twin-Pak®, the customer always receives the tower packing that is perfectly suited to his application.

The VFF-Twin-Pak® is individually available from 0.2 mm to 0.6 mm or in the standard wall thicknesses. An advantage that also pays off for all customers!

For further information please visit our website: www.vff.com

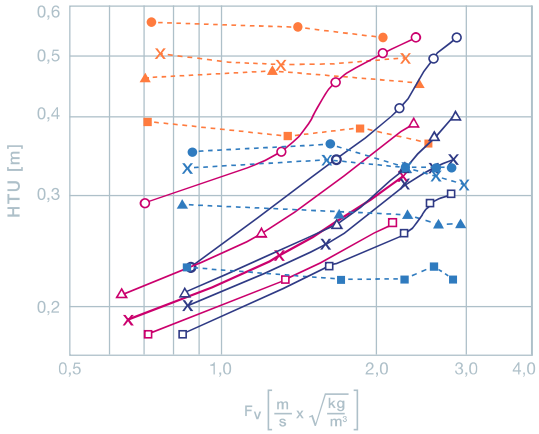
dp/H: VFF-Twin-Pak® No. 2 vs. Pall-50-M



VFF-Twin-Pak® No. 2
- uL = 0 m³/m²h
- uL = 30 m³/m²h
- uL = 40 m³/m²h
- uL = 60 m³/m²h
- uL = 100 m³/m²h

Pall-50-M
- uL = 0 m³/m²h
- uL = 30 m³/m²h
- uL = 40 m³/m²h
- uL = 60 m³/m²h
- uL = 100 m³/m²h

HTU: VFF-Twin-Pak® No. 2 vs. Pall-50-M



VFF-Twin-Pak® No. 2 / HTUov-NH_3
- uL = 10 m³/m²h
- uL = 20 m³/m²h
- uL = 30 m³/m²h
- uL = 40 m³/m²h

VFF-Twin-Pak® No. 2 / HTUoL-CO_2
- uL = 10 m³/m²h
- uL = 20 m³/m²h
- uL = 30 m³/m²h
- uL = 40 m³/m²h

Pall-50-M / HTUov-NH_3
- uL = 10 m³/m²h
- uL = 20 m³/m²h
- uL = 30 m³/m²h
- uL = 40 m³/m²h

Pall-50-M / HTUoL-CO_2
- uL = 10 m³/m²h
- uL = 20 m³/m²h
- uL = 30 m³/m²h
- uL = 40 m³/m²h

Physical properties VFF-Twin-Pak®

Nominal size	Spec. weight [kg/m³]	Spec. surface [m²/m³]	Free volume [%]
No. 1	200	200	97
No. 1,25	170	160	98
No. 1,5	150	135	98
No. 2	150	100	98
No. 3	140	80	98

VFF-Twin-Pak® (Patent VFF)
- No. 1, No. 1,25, No. 1,5, No. 2, No. 3

Brochure „VFF-Twin-Pak®“

The brochure can be downloaded under www.vff.com or requested at VFF!