# Plastic Jaeger Rings & Saddles (also called Pall Rings and Ballast Rings) Product Bulletin 700



Superior performance by design™ Raschig USA, Inc



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# **Raschig USA History**

In order to establish a new alliance in the mass transfer business RASCHIG GmbH and its parent company PMC GLOBAL INC have acquired JAEGER PRODUCTS INC. in 2006. At that time JAEGER PRODUCTS was a Houston Texas based company and a major manufacturer of tower packings, column internals and specialty trays and very active in the Mass Transfer and Environmental Business.

RASCHIG/JAEGER TECHNOLOGIES was founded as the result. In 2012 the name of the firm was changed to the current RASCHIG USA.

## Synergies

This strategic acquisition combining RASCHIG and JAEGER into one larger group gives a great advantage to our customers giving them access to products of both entities in Europe, The Americas and in other parts of the world. It will create new dimensions in mass transfer technology. The advantages of our process engineering know-how and our technologies benefit even more the planning, modernization and construction of our clients' processes. And: saving energy and investment cost is part of it.

The new alliance offers a diverse array of products to meet the mass transfer needs of the industries. While specializing in high performance products, the comprehensive products line of RASCHIG USA also includes traditional fractional trays as well as structured and random packing types that best fit the application.

# Leading In-house distributor test-facility

The company operates one of the largest in-house distributor test-facilities worldwide. Liquid distributors can be tested up to 12m (47 ft) in diameter at a maximum liquid load of 2400m3 per hour (10,570 US gpm).

All products of RASCHIG USA are the result of consistent development work long years of experience. Comprehensive quality management in all stages of production and the principle of offering complete solutions are the basis of our excellent reputation – worldwide.



# THE COMPANY

RASCHIG USA, Inc. is a manufacturer of tower packings, column internals, and specialty trays. Our products are common to many chemical processes and environmental applications where mass transfer equipment is needed. In 1978, the then Jaeger Products revolutionized the plastic random packing industry with the introduction of the high performance Jaeger Tri-Packs<sup>®</sup>. It is still the plastic random packing to which all others are compared. Other performance products include Max-Pak<sup>™</sup>, a sheet metal structured packing, Cascade Mini-Rings<sup>®</sup>, and the CoFlo<sup>™</sup> Tray, a new high capacity tray. While specializing in performance products, our comprehensive product line includes traditional packing types in plastic, metal, and ceramic. No other company offers such a diverse array of products to meet the mass transfer needs of the chemical and environmental industries. Raschig USA has the product to meet your most demanding application.

### **Technical Experience**

Of course, with such a comprehensive product line comes the need to design and build the many associated internals required to make mass transfer systems work effectively. Jaeger's capable engineering staff has the knowledge and experience to recognize the nuances of each system and offer the design that best fits the application. Each internal is custom made and matched exactly with the appropriate packing and operating conditions. Our vast database of experience will work for you. Ask about our written process guarantees.

#### **Customer Service**

A huge factor in the success of any company is their commitment to customer service. Our professional sales and customer service staff will provide competitive quotations promptly without having to wait weeks. Our commitment to quality products, ample inventories, same day air shipments, just in time delivery scheduling, and no minimum order quantities is partly why Raschig USA has the best customer service ranking in the industry. Jaeger has an able and ready staff to meet your service requests.

### **Facilities and Plants**

Raschig USA's corporate office is located in Arlington, TX. This facility houses the sales and engineering departments as well as light manufacturing and limited inventory. Our primary molding facility, formerly Century Plastics, is centrally located in El Dorado, KS for timely shipments anywhere in North America. Other affiliated offices include locations in Germany and other parts of the world.

The purpose of this brochure is to offer a brief overview of our product line. Should you require additional information on a product, please contact us for a brochure specific to that product or request a complete catalog. The additional information will offer performance curves, data for design use, as well as other information. We look forward to the opportunity to be of service



# **Comparison of Various Packed Column Internals**

In the last few years our industry has consolidated through varies acquisitions and mergers. Because of these business activities part numbers for varies items have become difficult to follow. In an effort help everyone with this conversion the chart below is provided. The information for Raschig USA is very accurate; however, because of some unique design characteristics some part numbers could be interpreted using slightly different numbers.

The information provided for the other vendors is our best effort to convert there system to "fit" our numbering system; again this information is subject to some interpretation due to constantly changing designs.

At best this information should be used as a starting point or a guide. Do to the nature of the information we cannot guarantee its accuracy.

Internals	Raschig	Jaeger	Sulzer CT	Old Norpro	Koch-Glitsch-Norpro
Liquid Distributor /	DR 2	LD1, CR1	VSL, VSI, VSH	106, 845, 107	301A, 301B, 906
Redistributor	DR 3	LD5, CR5		798	301A, 301B, 905
	DT 1	LD4	VEG, VKG	126, 1016	126, 320, 926
	DT 1 <sup>(1)</sup>	LD4 <sup>(1)</sup>	VKR	136	136, 321, 986
	DT 2 <sup>(2)</sup>	LD4 <sup>(2)</sup>	MTS, VEL, VEP	806	310, 302, 806, 985
	DT 2 <sup>(1)</sup>	LD4 <sup>(2)</sup>	MTS, VEL, VEP	126, 1016, 127, 1017	
	RP 2	LD1, CR1		116, 816, 117, 817	301A & D, 916, 917
	RP 2 <sup>(1)</sup>	LD2, CR2		116, 1006, 117, 851, 1007	301B & D, 116, 117
	DP 1	LD3, LD7	VRG	844, 141	304, 330, 342, 941
	DP-S	LD6	VRD	1044	344, 305, 1044, 943
	DT-S	LD4 <sup>(1)</sup>	VEL, VEP	136, 137	312, 312S
	DT-MF	LD-MF	VKRPW		996
Feed Pipe	DP-P	FP1	VR, LV	119, 129, 719, 729	340, 119, 719
Gas	GV 1	GD3	GIO, GIG	196, 198	342, 746
Distributor	GV 2	GDS Vane Type	GIV	194	351, 768
	GV 3	GD2	SK	896	716
Flash Device	FB 1	FP1 <sup>(3)</sup>		655	300, 745
	FB 2			855	705
	FB 3		LRR, LRP	755	341, 755
	FB 3/RP 2			898	300
Bed Limiter - Random	HP 1	BL1	RPB	103, 823	401
- Random	HP 2	BL1			402
- Structured	HP-P	BL2	HE, HS	133	403
Support Plate - Random	SP 1	PS1	GIS	804, 819, 1019	101R, 804
- Random	SP 2, SP 3	PS1	EMS	809, 818	101, 103, 814, 824
- Structured	SP-P	PS2	TEB, TSB	134	102, 802
	SP-HG				104
	SP 1/ RP 2				201A, 201B
Liquid	CV 1	CT3, CRS	SLR	633	510, 511
Collector	CP 1	CT1	SK	733	501
	CP 2	CT2	SK	833	501
Liq-Liq extraction	DSP 1			834	600
(internals not in Raschig	DSP 2			835	600
HB)	DP-P			644, 744	

(1) Drip tubes in troughs

(2) Notches with drip tubes

(3) Flash Device



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# **Jaeger Rings & Jaeger Saddles**

Jaeger Rings and Saddles are conventionally shaped packings that offer a good performance at an economical price when compared to similar packing. They represent the oldest, and perhaps most common, type of plastic packings used over the past 40 years.

Plastic Jaeger Rings and Plastic Jaeger Saddles give comparable hydraulic and mass transfer performance to ring and saddles supplied by other manufacturers. Plastic Jaeger Rings are equivalent to the Flexiring<sup>®</sup> and the Ballast<sup>TM</sup> Ring. Plastic Jaeger saddles are equivalent to the Super Intalox Saddle<sup>®</sup>, the Flexisaddle<sup>TM</sup>, and the Ballast Saddle<sup>TM</sup>.



# **Plastic Jaeger Rings** Specifications & Physical Properites

#### **Materials**

Twelve standard, injection moldable plastics are available: Polypropylene (PP)TopEx® (LCP) Polyethylene (PE)Kynar® (PVDF) Polypropylene Halar® (ECTFE) Glass-Filled (PPG)Teflon® (PFA) Noryl® (PPO) Tefzel® (ETFE) Polyvinylchloride (PVC)Tefzel® Glass-CorzanTM (CPVC)Filled (ETFE-G)

Other plastics are available on request.

IMPORTANT NOTE:

Design data presented in this bulletin are for preliminary calculations only. Contact Raschig USA before finalizing design



		oportiot			
Size (in.)	5/8	1	1 1⁄2	2	3
Geometric Surface Area* (ft <sup>2</sup> /ft <sup>3</sup> )	108	64	44	33	22
Packing Factor (1/ft)	97	52	32	25	16
Void Space (%)	86	90	91	92	93
Bulk Density (lb/ft <sup>3</sup> ) (PP)	7.75	5.50	4.75	4.25	3.75

#### **Properties Table**

## Applications

Scrubbing and absorption for odor control Stripping and degassing for water treatment Particulate removal from gases Aeration, ozonation, and mixing Biological treatment Cooling tower Mist elimination Other heat and mass transfer applications

## Packaging

5 ft<sup>3</sup> and 10 ft<sup>3</sup> corrugated cardboard cartons constitute standard packaging. Other packaging, including bulk containers or bags, is available on request. Because of the small size of standard packaging and associated wall effects and settling, Raschig USA recommends that packaged volumes of 10% in excess of the bed volume be ordered to ensure full beds upon installation



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![](_page_8_Figure_0.jpeg)

![](_page_9_Figure_0.jpeg)

![](_page_10_Figure_0.jpeg)

![](_page_11_Figure_0.jpeg)

![](_page_12_Figure_0.jpeg)

# Plastic Jaeger Saddles Specifications & Physical Properites

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#### **Materials**

Twelve standard, injection moldable plastics are available: Polypropylene (PP)TopEx® (LCP) Polyethylene (PE)Kynar® (PVDF) Polypropylene Halar® (ECTFE) Glass-Filled (PPG)Teflon® (PFA) Noryl® (PPO) Tefzel® (ETFE) Polyvinylchloride (PVC)Tefzel® Glass-CorzanTM (CPVC)Filled (ETFE-G)

Other plastics are available on request.

IMPORTANT NOTE: Design data presented in this bulletin are for preliminary calculations only. Contact Raschig USA before finalizing design

![](_page_13_Picture_6.jpeg)

Size (in.)	1	2	3
Geometric Surface Area* (ft <sup>2</sup> /ft <sup>3</sup> )	60	30	20
Packing Factor (1/ft)	33	21	16
Void Space (%)	91	94	95
Bulk Density (Ib/ft <sup>3</sup> ) (PP)	4.74	3.25	2.75

#### **Properties Table**

## Applications

Scrubbing and absorption for odor control Stripping and degassing for water treatment Particulate removal from gases Aeration, ozonation, and mixing Biological treatment Cooling tower Mist elimination Other heat and mass transfer applications

## Packaging

5 ft<sup>3</sup> and 10 ft<sup>3</sup> corrugated cardboard cartons constitute standard packaging. Other packaging, including bulk containers or bags, is available on request. Because of the small size of standard packaging and associated wall effects and settling, Raschig USA recommends that packaged volumes of 10% in excess of the bed volume be ordered to ensure full beds upon installation

![](_page_13_Picture_13.jpeg)

![](_page_14_Figure_0.jpeg)

![](_page_15_Figure_0.jpeg)

![](_page_16_Figure_0.jpeg)

![](_page_17_Figure_0.jpeg)

# Physical Properties of Raschig USA Packings

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	Size	Packing	Weight	Surface	Void
	(nominal)	Factor	[lb/ft <sup>3</sup> ]	Area	Space
		[1/ft]		[ft²/ft3]	[%]
	1	Plastic Packing			
	1"	28	6.2	85	90
Jaeger Tri-Packs®	<b>1</b> 1/4"	25	5.6	70	92
	2"	16	4.2	48	93.5
	31/2"	12	3.3	38	95
Pacabia Supar Dina	Nr. 0.6		3.9	63	93
Raseing Super-Ring	Nr. 2		3.5	30.5	96
	1"	26	4.0	85	92
Cascade Mini-Rings®	2"	16	3.5	50	93
	31/2"	12	3.2	40	94
	5/8"	97	7.8	108	86
	1"	52	5.9	64	80
Jaeger Rings	11/4"	32	4.8	44	91
	2"	25	4.3	33	92
	31/2"	16	3.8	26	93
	1"	33	4.7	60	91
Jaeger Saddles	2"	21	3.3	30	94
	3"	16	2.8	20	95
Bio-Ring™	31/2"	NA	2.8	32	95
Cascade Bio-Rings <sup>™</sup>	7"	NA	2.2	30	95
	Ra	ndom Metal Packing			
	Nr. 0.3		21.2	96	96
	Nr. 0.5		17.2	76.2	97
	Nr. 0.7		11.6	55	98
Raschig Super-Ring	Nr. 1		10.3	45.7	98
	Nr. 1.5		10.6	36.5	98
	Nr. 2		10.6	30.5	98
	Nr. 3		9.4	24.4	98
	Meta	al Structured Packing	3		
	100Y		-	30.5	98
	150Y			45.7	98
	200Y			61	98
	250Y			76.2	98
Raschig Super-Pak	300Y			91.5	98
	350Y			106.7	97
	400Y			122	97
	500Y			152.4	96
	750Y			228.6	96
Max-Pak™	1/2"	19-22	12.8	77	97
		Ceramic Packing			
	1/2"	201	43.0	190	73
	3/4"	131	41.0	102	7/
		07	41.0	102	74
Novalox <sup>®</sup> Saddles	11/2"	52	40.3	10	75
	1 1/2 " 0 !!	5∠ 40	40.3	01	/5 77
	2"	40	30.8	3/ 20	11
	3"	22	35.9	28	11

Weights of plastic based on polypropylene Weights of metal based on 300 series stainless steel All weights are dry weights

![](_page_18_Picture_4.jpeg)

100 General Product Information
200 Metal Random - RSR
300 Mist Eliminators - Wire Mesh
400 Fractionation Trays and Hardware
450 High Capacity - Nye Trays
475 High Capacity - CoFlo Trays
500 Metal Structured Packing - RSR
525 Metal Structured Packing - RSP

600 Plastic Random – Jaeger Tri-Pack/Hackentten

625 Plastic Random – RSR

650 Plastic Random – LPR

675 Plastic Random – Nor Pak

700 Plastic Random – Rings and Saddles

800 Ceramic Random Packing

900 Winsorp Software

1000 Process Information

1100 Column Internals

1200 Reactor Internals

#### **Locations / Production Sites**

Ludwigshafen and Espenhain, Germany Arlington, Texas Dallas, Texas El Dorado, Kansas Monterrey, Mexico.

Furthermore we co-operate with reliable partners all over the world

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![](_page_19_Picture_18.jpeg)