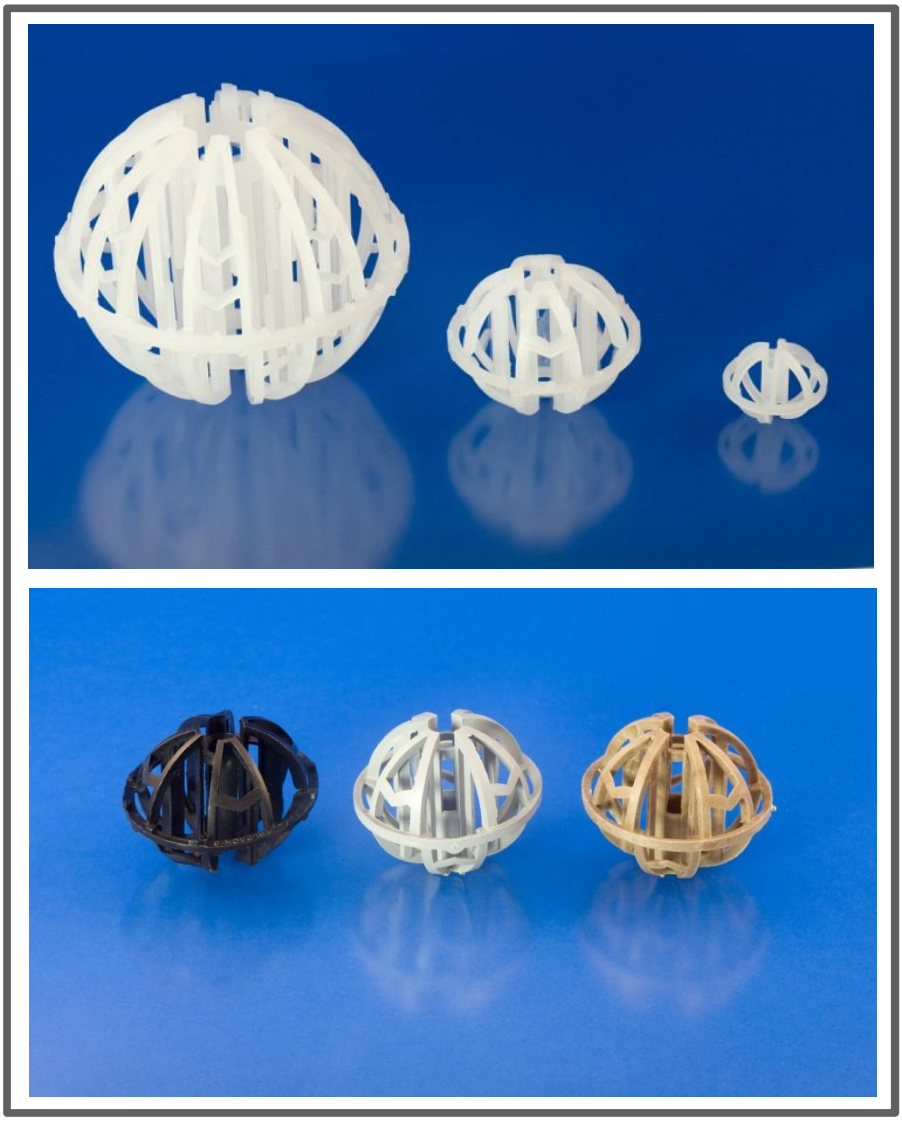
Raschig USA Inc.®

Jaeger Tri-Packs®

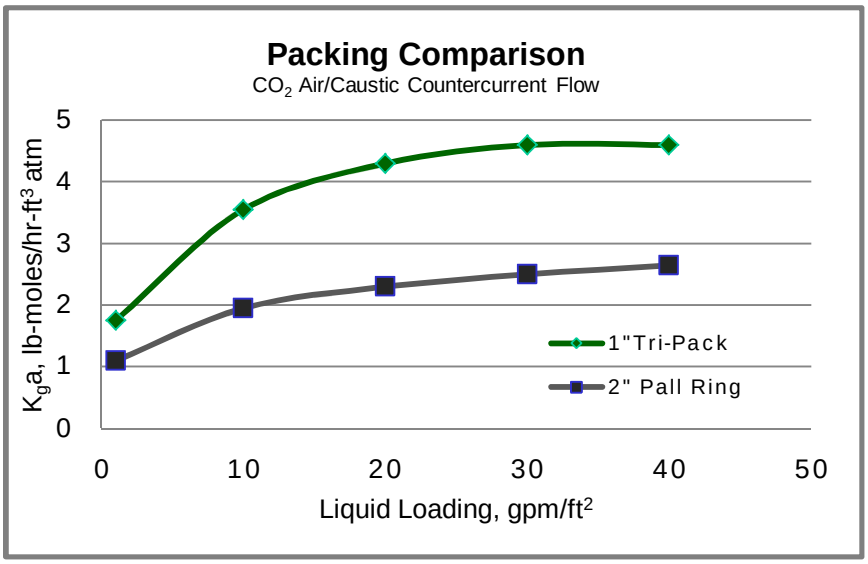
Product Bulletin 600

High-performance, free-flowing random spherical packing for scrubber and stripper applications.



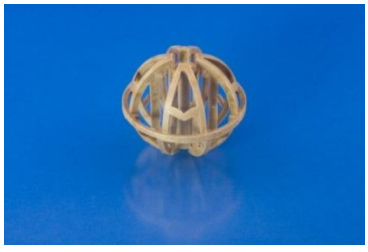
Jaeger Tri-Packs® are the industry standard in hi-performance spherical random packing. Available in a full spectrum of thermoplastic and engineering resins, they offer high mass transfer rates, excellent gas and liquid dispersion characteristics, and superior fouling resistance. Their spherical shape excels in handling and ease of installation, resists nesting and settling and makes removal easy.

Size	1"	2"	3.5"
Geometric Surface Area (ft^2/ft^3)	85	48	38
Packing Factor (1/ft)	28	16	12
Void Space (%)	90.0	93.5	95.0
Bulk Density (lb_m/ft^3, reference: polypropylene)	6.2	4.2	3.3

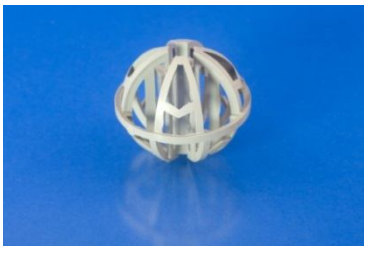


***Jaeger Tri-Packs®** have significantly higher mass-transfer efficiency than conventional pack-ings such as comparably sized pall rings.*

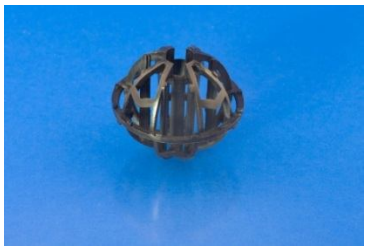
Jaeger Tri-Packs® are availible in a variety of resins:



Tefzel



CPVC



Talc filled PP for use in applications that require the packing to sink.

Maximum Operating Temperature for Plastic Jaeger Tri-Packs®

Material	Maximum Temperature Degrees F 1 atm, Air / Water At Maximum Recommended Bed Depth*	Bulk Density Factor
Polyvinyl Chloride, PVC	140	1.5
Polyethylene, PE	180	1.02
Polypropylene, PP	180	1.00
Corzan™, CPVC	230	1.74
Chlorinated Polyvinyl Chloride, CPVC	210	1.74
Polypropylene, Glass Filled 10 – 30%, PP-G	210 – 230**	1.17-1.38**
Noryl®, PPO	230	1.24
Kynar®, PVDF	280	1.98
Halar®, ECTFE	290	1.86
Tefzel®, ETFE	350	1.93
Teflon®, PFA	400	2.45
Tefzel®, Glass Filled 25%, ETFE-G	410	2.2

*Dependent upon project specifications, please contact Raschig USA to discuss.

**Depending upon actual glass content.

NOTE: The data presented here are intended as a general guide only. This data should not be used for design purposes without first consulting with Raschig USA.

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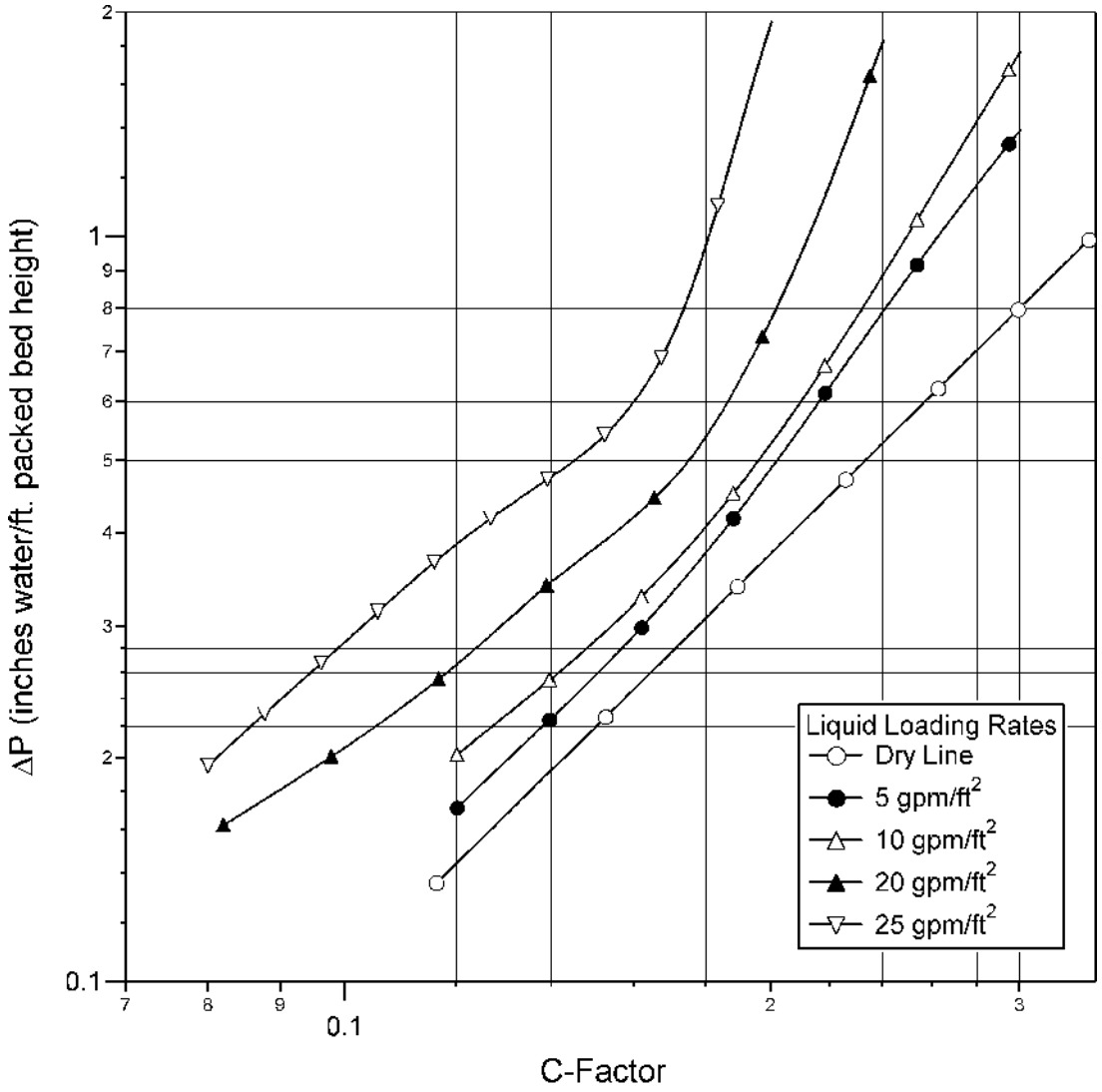
Pressure Drop vs. C-Factor
1” Plastic Jaeger Tri-Packs®

Ambient Air-Water Systems for Various Liquid Loadings



C-Factor = $V_s[(\rho_V)/(\rho_L - \rho_V)]^{1/2}$ where

V_s = Superficial Vapor Velocity in ft/sec

ρ_L and ρ_V = Density of Liquid and Vapor in lb/ft^3

For Air/Water systems at 70oF & 1 atm: C-Factor x 7776.2 = lb/hr-ft2; gpm/ft2 x 499.7 = lb/hr-ft2

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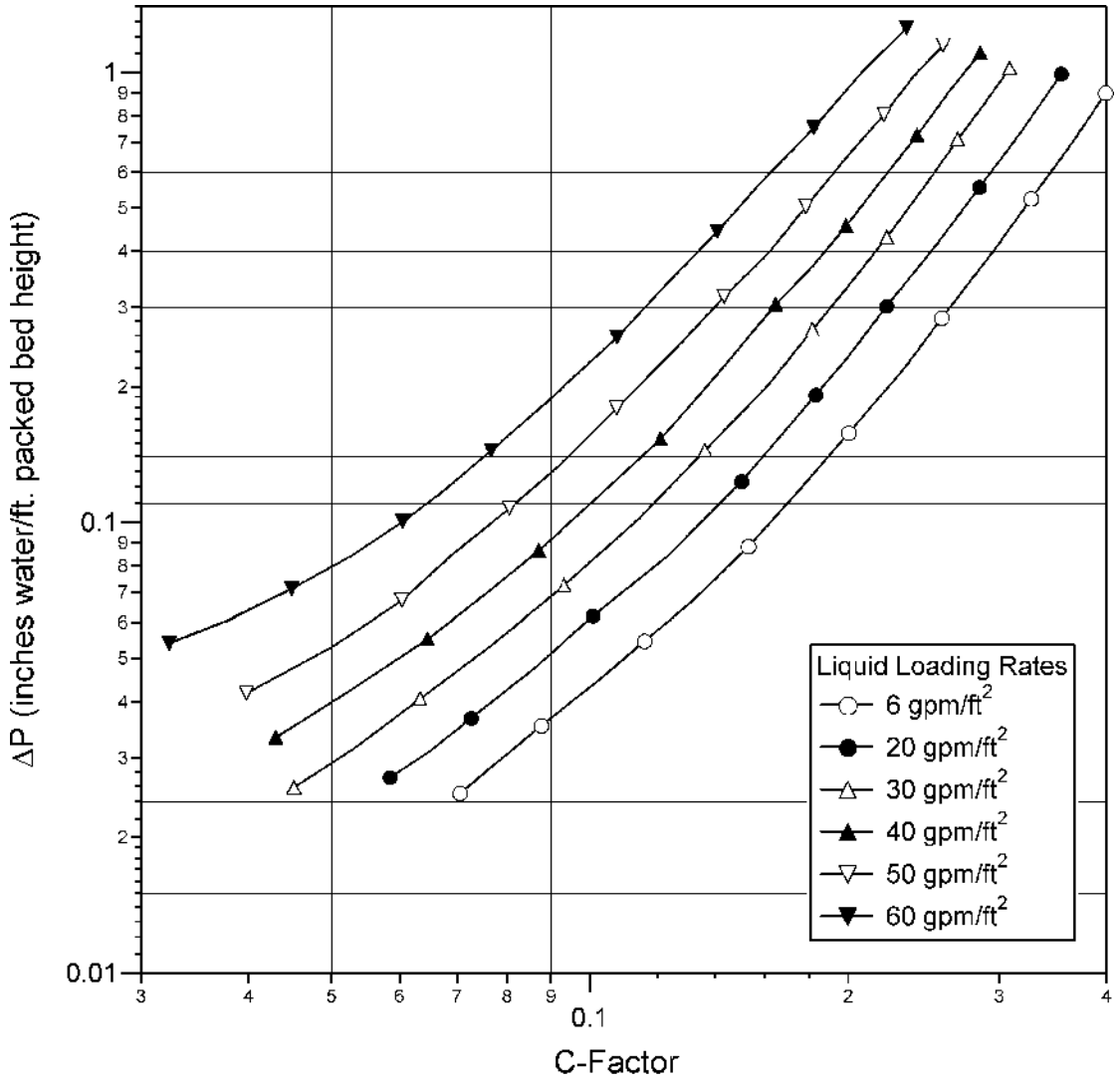
Pressure Drop vs. C-Factor
2” Plastic Jaeger Tri-Packs®

Ambient Air-Water Systems for Various Liquid Loadings



$C\text{-Factor} = V_s[(\rho_V)/(\rho_L - \rho_V)]^{1/2}$ where
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ρ_L and ρ_V = Density of Liquid and Vapor in lb/ft^3

For Air/Water systems at 70oF & 1 atm: C-Factor x 7776.2 = lb/hr-ft2; gpm/ft2 x 499.7 = lb/hr-ft2

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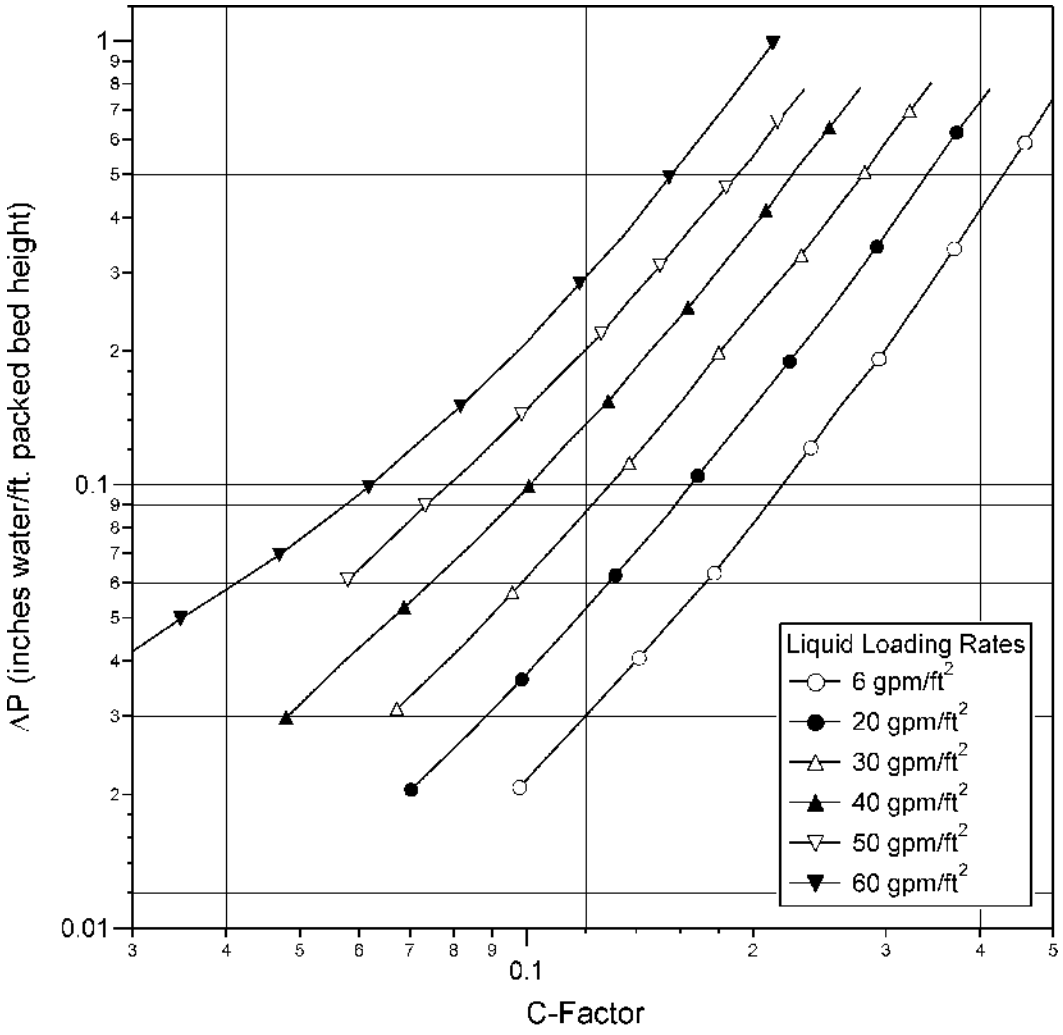
Pressure Drop vs. C-Factor
3.5” Plastic Jaeger Tri-Packs®

Ambient Air-Water Systems for Various Liquid Loadings



$C\text{-Factor} = V_s[(\rho_V)/(\rho_L - \rho_V)]^{1/2}$ where

V_s = Superficial Vapor Velocity in ft/sec

ρ_L and ρ_V = Density of Liquid and Vapor in lb/ft^3

For Air/Water systems at 70 °F & 1 atm: C-Factor x 7776.2 = lb/hr-ft2; gpm/ft2 x 499.7 = lb/hr-ft2

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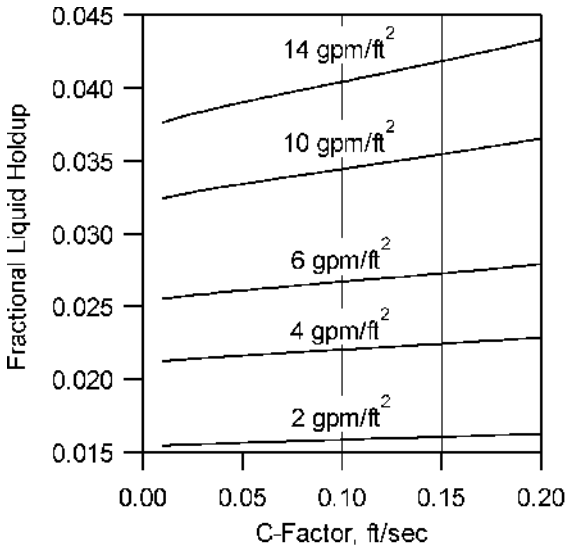
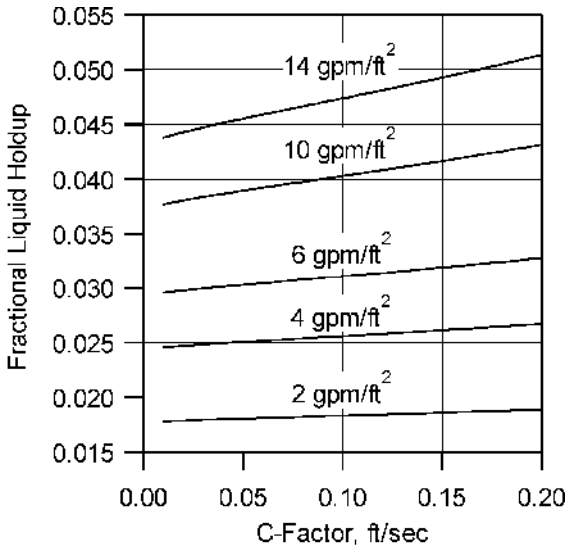
Liquid Holdups

Jaeger Tri-Packs®

31/2” Jaeger Tri-Packs®



2” Jaeger Tri-Packs®

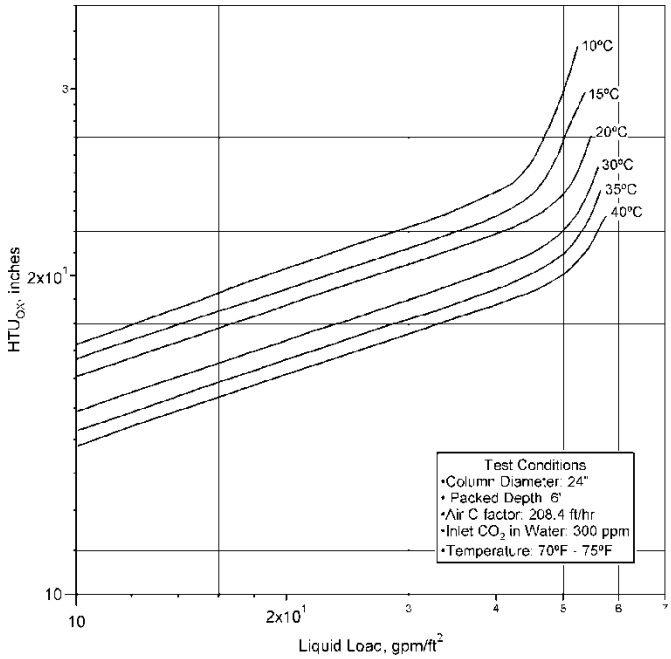


Fractional holdups estimated from formula presented in I&EC Research, 5(33), 1222 (1994).

For Air/Water systems at 70oF & 1 atm: C-Factor x 7776.2 = lb/hr-ft2; gpm/ft2 x 499.7 = lb/hr-ft2

HTU_{OX} for CO_2 Desorption from Water

2” Plastic Jaeger Tri-Packs®



For Air/Water systems at 70oF & 1 atm: C-Factor x 7776.2 = lb/hr-ft2; gpm/ft2 x 499.7 = lb/hr-ft2

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Absorption / Scrubbing

MASS TRANSFER DATA

Absorption System	G lb/hr-ft2	L lb/hr-ft2	°F	HTU (inch) 1" Size	HTU (inch) 2" Size	HTU (inch) 3.5" Size
HCl – H2O	11792	2048	77	7.0	10.6	12.0
HCl – NaOH	1567	2048	68	6.1	8.8	10.0
Cl2 – NaOH	1229	2202	122	9.9	14.5	16.0
NH3 – H2SO4	492	1024	68	4.1	6.0	7.0
NH3 – H2O	512	4096	68	3.6	5.4	6.2
SO2 - NaOH	1946	4096	140	8.1	12.0	14.0
H2S – NaOH	1229	1331	68	13	19.4	22.0

Typical Design Parameters

Gas Velocity: ***100-500 ft/min*** This parameter is determined by the cross-sectional area of the scrubber as seen by the gas flow. In counter-current scrubbers this area corresponds to the cross-section of the tower. In cross- flow scrubbers, it corresponds to the cross-section on a vertical plane of the packed bed.

Liquid Loading : ***2-10 gpm/ft2*** These loadings are based on the cross-sectional area of the scrubber as seen by the liquid. In counter-current scrubbers, this area corresponds to the cross-section of the tower. In cross-flow scrubbers, it corresponds to the cross-section on a vertical plane of the packed bed. Contact Raschig USA to discuss your particular project.

Packing Size: For random dump packings typically scrubber diameter/packing size ratio is 12:1.

pH: pH needs to be specified and controlled for any absorption involving contaminants which can dissociate in aqueous solution. Contact Rachig USA for advice for your specific application.

Pressure Drop: Packed bed pressure drop in new scrubbers should be between 0.02" and 0.2" water/ft of packed bed depth.

Blowdown and Makeup Rates: These two variables need to be initially determined by process design and material balance considerations within the constraints mentioned above. Please ask Raschig USA for advice regarding initial set points. Typically these values will be adjusted over time based upon operational experience.

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Other product bulletins from Raschig USA, Inc.:

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 – MaxPak

550 Plastic Structured Packing – RSP

600 Plastic Random – Jaeger Tri-Pack/Hacketten

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

For more information and design assistance, please contact us at:

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