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.

<table>
<thead>
<tr>
<th>Size</th>
<th>1&quot;</th>
<th>2&quot;</th>
<th>3.5&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometric Surface Area (ft²/ft³)</td>
<td>85</td>
<td>48</td>
<td>38</td>
</tr>
<tr>
<td>Packing Factor (1/ft)</td>
<td>28</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Void Space (%)</td>
<td>90.0</td>
<td>93.5</td>
<td>95.0</td>
</tr>
<tr>
<td>Bulk Density (lb/ft³, reference: polypropylene)</td>
<td>6.2</td>
<td>4.2</td>
<td>3.3</td>
</tr>
</tbody>
</table>

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

Jaeger Tri-Packs® are available 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®

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

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

Ambient Air-Water Systems for Various Liquid Loadings

\[ \Delta P \text{ (inches water/ft, packed bed height)} \]

\[ C \text{-Factor} = \frac{V_s (\rho_v)}{(\rho_L - \rho_v)}^{1/2} \text{ where} \]
\[ V_s = \text{Superficial Vapor Velocity in ft/sec} \]

\[ \rho_L \text{ and } \rho_v = \text{Density of Liquid and Vapor in lb/ft}^3 \]

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

Ambient Air-Water Systems for Various Liquid Loadings

\[ \Delta P \text{ (inches water/ft, packed bed height)} \]

\[ C\text{-Factor} = \frac{V_s}{\left(\rho_L \cdot (\rho_L - \rho_v)\right)^{1/2}} \text{ where} \]

\[ V_s = \text{Superficial Vapor Velocity in ft/sec} \]

\[ \rho_L \text{ and } \rho_v = \text{Density of Liquid and Vapor in lb/ft}^3 \]

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

Ambient Air-Water Systems for Various Liquid Loadings

\[ \Delta P \text{ (inches water/ft packed bed height)} \]

\[ 0.1 \]

\[ 3 \ 4 \ 5 \ 6 \ 7 \ 8 \ 9 \ 10 \]

\[ 0.1 \ 0.2 \ 0.3 \ 0.4 \ 0.5 \ 0.6 \ 0.7 \ 0.8 \ 0.9 \ 1 \]

\[ \text{C-Factor} \]

C-Factor = \( V_s \left[ \frac{(\rho_l - \rho_v)}{(\rho_l + \rho_v)} \right]^{0.5} \)
where

\( V_s = \) Superficial Vapor Velocity in ft/sec
\( \rho_l \) and \( \rho_v = \) Density of Liquid and Vapor in lb/ft³

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

Raschig
Raschig USA Inc.®
Liquid Holdups
Jaeger Tri-Packs®

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

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

HTU_{OX} for CO_2 Desorption from Water
2” Plastic Jaeger Tri-Packs®

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
Absorption / Scrubbing

MASS TRANSFER DATA

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.
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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817-695-5680
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