HPTR CYLINDER DESIGN OPTIONS

**CYLINDER BREATHERS**

Standard breather elements secure a SureSeal washer device and a wire mesh. Efficiency is improved by periodically putting several drops of oil into the breather hole.

<table>
<thead>
<tr>
<th>Bore Diameter</th>
<th>Pressure (Psig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00&quot;</td>
<td>500</td>
</tr>
<tr>
<td>2.50&quot;</td>
<td>635</td>
</tr>
<tr>
<td>3.00&quot;</td>
<td>760</td>
</tr>
<tr>
<td>3.50&quot;</td>
<td>889</td>
</tr>
<tr>
<td>4.00&quot;</td>
<td>1016</td>
</tr>
</tbody>
</table>

**SAFE TO PIPE ADAPTERS**

These provide a simple means of controlling the stroke of standard cylinders. Stroke control segments are sold in sets, each containing four individual segments.

Model 83217: For 1-1/8" (28.6 mm) and 1-1/2" (38.1 mm) rod sizes.

Model 20917A: For 2" (50.8 mm) rod sizes.

**CLEVIS PINS**

Clevis pins, in four different lengths, are designed for all types of hydraulic applications. These pins are plated to resist rust or corrosion. They improve alignment and reduce shaft and seal wear caused by worn pins.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Length</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>35890B</td>
<td>Pin &amp; Clip</td>
<td>3.1&quot;</td>
<td>25.4 mm</td>
</tr>
<tr>
<td>35891B</td>
<td>Pin &amp; Clip</td>
<td>3.3&quot;</td>
<td>31.8 mm</td>
</tr>
<tr>
<td>35892B</td>
<td>Pin &amp; Clip</td>
<td>3.8&quot;</td>
<td>38.1 mm</td>
</tr>
</tbody>
</table>

**STROKE CONTROL SEGMENTS**

These provide a simple means of controlling the stroke of standard cylinders. Stroke control segments are sold in sets, each containing four individual segments.

Model 83217: For 1-1/8" (28.6 mm) and 1-1/2" (38.1 mm) rod sizes.

Model 20917A: For 2" (50.8 mm) rod sizes.

**COLUMNS STRENGTH CURVES**

1. Find column load on vertical axis of graph. Find extended pin center of cylinder on horizontal axis. The intersection of the line running horizontally from the load axis and the line running vertically from the pin center axis locates the minimum allowable rod size.

2. These curves indicate total load limits only. When side loads are present consult factory.

3. The above curves apply to cylinders where the rod out dimension (R) is approximately 50% of the extended pin center dimension (L).

4. The vertical portion of the respective curves indicate the maximum recommended extended length. Consult factory if an application must exceed the recommended maximum extended length.

5. The above curves apply to cylinders with solid rods only. Bracing cylinder at the rod guide area will increase column strength. Consult factory for relevant application information.

**HPTR SERIES HIGH-PRESSURE TIE-ROD HYDRAULIC CYLINDERS**

**Cylinder Force Chart**

- Axial Compressive Load in Pounds (N)

For Working Pressures to 3265 PSIG (225 BAR)
SPECIFICATIONS - CUSTOM STROKE LENGTH MODELS

These cylinders are rated for 3256 PSIG (225 bar) working pressure, although the safe working pressure may be greatly reduced when cylinders are operated in the extend mode due to rod buckling considerations. Please consult the factory if assistance in sizing is needed!

Also, cylinders with fully extended lengths of 40 inches (101.6 cm) or greater, when used in the extend mode, should include a stop tube of one (1) inch (2.54 cm) for each ten inches (25.4 cm) of fully extended length over 40 inches (101.6 cm).

WARNING: These cylinders are designed for limited duty use at 3265 PSIG (225 bar) maximum pressure. Consult factory if your application requires maximum pressure and full reversal loading where failure could result in injury to persons or property damage.

SAE SPECIFICATIONS / MODEL NUMBERS

These cylinders have the same construction and operating specifications as the custom length models on page 3. These models, however, are supplied as standard eight-inch (20.3 cm) stroke cylinders that meet ASAE mounting standards for that specific bore size.

Please use caution in applying the four-inch (10.2 cm) bore model listed in the chart below. Although the cylinder is rated for service up to 3265 PSIG (225 bar), the one-inch (2.54 cm) pins that are called for as part of SAE standard S201.4 are for use on implements with loads induced on the pins below 1450 PSIG (100 bar) in four-inch (10.2 cm) bore cylinders. The service life at higher pressures is severely reduced and may potentially create a hazard. Normal service may be expected at 3265 PSIG (225 bar) in an application if the cylinder is loaded in only one direction.

Consult the factory for further information on pin life!