TRADITIONAL SIZING & SELECTION INFORMATION

In general, the majority of pump pulsation problems can be traced to and remedied on the suction side of a pump - even though some symptoms may show up on the discharge side. In feeding the pump, it is imperative to maintain a steady flow of fluid through the suction valves. Also, the fluid column must attach thoroughly to the face of the plunger to achieve complete cylinder fill on the suction stroke. Therefore, it is recommended that pulsation stabilizers be attached to the suction side first, then the discharge side of the pump.

TO SIZE STABILIZERS, YOU WILL NEED:

1. MAXIMUM OPERATING PRESSURES (SUCTION & DISCHARGE)
2. PUMP CONNECTION SIZES AND TYPES
3. PUMP STROKE LENGTH AND PLUNGER SIZE
4. FLUID TYPE AND TEMPERATURE

MAXIMUM PUMP OPERATING PRESSURES:  EXAMPLE: SFT-14403-F-300
DENOTES STABILIZER MAXIMUM WORKING PRESSURE

PUMP CONNECTION SIZES:  EXAMPLE: SFT-14403-F-300

NOTE:  THE STABILIZER OPENING SHOULD BE THE SAME SIZE AS THE PUMP OPENING OR LARGER. FLANGED AND THREADED SIZES ARE AVAILABLE FROM 1” TO 14” DEPENDING ON THE SERIES

<table>
<thead>
<tr>
<th>ANSI RATING</th>
<th>ANSI 150</th>
<th>ANSI 300</th>
<th>ANSI 600</th>
<th>ANSI 900</th>
<th>ANSI 1500</th>
<th>ANSI 2500</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORKING PSI</td>
<td>150 PSI</td>
<td>450 PSI</td>
<td>1440 PSI</td>
<td>2100 PSI</td>
<td>3600 PSI</td>
<td>5000 PSI</td>
</tr>
<tr>
<td>SERIES #</td>
<td>1500</td>
<td>4500</td>
<td>14400</td>
<td>21000</td>
<td>36000</td>
<td>50000</td>
</tr>
</tbody>
</table>

PUMP CAPACITY:  EXAMPLE: SFT-14403-F-300
DETERMINE STABILIZER VOLUME NEEDED (CUBIC INCHES) USING STROKE LENGTH AND PLUNGER DIAMETER (SEE CHART BELOW)  (THIS IS A GENERAL SIZING CHART - ALL FACTORS OF PUMPING STATION MUST BE CONSIDERED - IN SPECIAL INSTANCE PLEASE CALL FACTORY FOR PROPER SIZING.)

SUCTION

<table>
<thead>
<tr>
<th>PUMP STROKE LENGTH</th>
<th>CUBIC INCH STABILIZER</th>
<th>CONNECTION SIZES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1/2 or SHORTER</td>
<td>100 CU.IN.</td>
<td>1” to 3”</td>
</tr>
<tr>
<td>2-3/4” to 4”</td>
<td>300 CU.IN.</td>
<td>2” to 8”</td>
</tr>
<tr>
<td>4-1/2” to 6”</td>
<td>600 CU.IN.</td>
<td>2” to 8”</td>
</tr>
<tr>
<td>6” to 8”</td>
<td>900 CU.IN.</td>
<td>3” to 8”</td>
</tr>
<tr>
<td>9” to 12”</td>
<td>1200 CU.IN.</td>
<td>3” to 8”</td>
</tr>
<tr>
<td>10” to 14”</td>
<td>2400 CU.IN.</td>
<td>4” to 14”</td>
</tr>
<tr>
<td>12” to 15”</td>
<td>4800 CU.IN.</td>
<td>4” to 14”</td>
</tr>
</tbody>
</table>

DISCHARGE

<table>
<thead>
<tr>
<th>PUMP STROKE LENGTH</th>
<th>CUBIC INCH STABILIZER</th>
<th>CONNECTION SIZES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1/2 or SHORTER</td>
<td>100 CU.IN.</td>
<td>1” to 3”</td>
</tr>
<tr>
<td>3” to 4”</td>
<td>300 CU.IN.</td>
<td>2” to 8”</td>
</tr>
<tr>
<td>5” to 12”</td>
<td>600 CU.IN.</td>
<td>2” to 8”</td>
</tr>
<tr>
<td>10” to 12”</td>
<td>1200 CU.IN.</td>
<td>3” to 8”</td>
</tr>
</tbody>
</table>

NOTE: Below 2100 PSI
1200 CU.IN.  3” to 8”

FLUID TYPE & TEMPERATURE:
FLUID THAT IS PUMPED MUST BE COMPATIBLE WITH THE INTERNAL CARTRIDGE (NITRILE IS STANDARD UNLESS OTHERWISE SPECIFIED - SEE PAGE 13 FOR ADDITIONAL INFORMATION ON ELASTOMER COMPATIBILITY)
Gas charged units are sized using the following equation:

\[
\text{Size} = \frac{c \cdot D^2 \cdot S \cdot (\text{Ps or Pd})}{\% \cdot (\text{Pcs or Pcd})}
\]

**“c”** equals:
- 0.100 for Triplex SA
- 0.030 for Quintuplex SA
- 0.684 for Simplex SA
- 0.558 for Simplex DA
- 0.558 for Duplex SA
- 0.196 for Duplex DA

“Size”  
Equals gas volume retained in vessel

“D”  
Equals diameter of plunger or piston

“S”  
Equals stroke length of pump in inches

“Ps”  
Or “Pd”  
Equals pump operating Pressure in System  
(\(\text{Ps} = \text{suction operating pressure} / \text{Pd} = \text{discharge operating pressure}\))

“Pc”  
Equals pre-charge pressure  
(\(\text{Pcs} = \text{Pre-charge press - suction} / \text{Pcd} = \text{Pre-charge press - discharge}\))

“%”  
Equals Residual Pulsation as a percent of “P” expressed as a whole number. For instance 4% goes into the equation as “4”

(Note - % can be different for suction and discharge)

Example Operations: 2.25” X 3” single acting triplex pumping with a discharge pressure of 1360 psig and suction pressure of 2.7 psig, with a recommended 4% suction stabilizer performance and a recommended 4% discharge dampener performance level. PPC recommends that gas pre-charge pressure be maintained to insure performance levels noted within this calculation.

**Notes: In this application, the following are the inputs.**
- \(\text{Ps} = 2.7\) psig
- \(\text{Pd} = 1360\) psig
- \(\text{Pcs} = 1.5\) psig (PPC recommended pre-charge pressure for suction stabilizer is approximately 50% to 60% of suction operating pressure (Ps) – not to exceed maximum pre-charge pressure of the cartridge)
- \(\text{Pcd} = 500\) psig (PPC recommended pre-charge pressure for discharge dampener is approximately 60% to 80% of discharge operating pressure (Pd) – not to exceed maximum pre-charge pressure of the cartridge)
- \(c = 0.100\) for triplex single acting pump
- \(D = 2.25\)
- \(S = 3\)
- \(\% = 4\) Performance selected

**SUCTION STABILIZER SIZING:**

Size = \([0.100 \times 2.25^2 \times 3 \times 2.7] / [4 \times 1.5] = 0.69\) gallons  
The size in the equation above equates to gas volume in gallons.

Size conversion – 0.69 gallons x 231 cubic inch / gallon = 159.4 cubic inch  
Unit selected is a 300 cubic inch (1.3 gallons) unit with a pre-charged cartridge.  
Performance criteria of 4% is satisfied.

**Discharge Sizing:**

Size = \([0.100 \times 2.25^2 \times 3 \times 1360] / [4 \times 500] = 1.04\) gallons  
The size in the equation above equates to gas volume in gallons.

Size conversion – 1.04 gallons x 231 cubic inch / gallon = 240.3 cubic inch  
Unit being offered is a 300 cubic inch (1.3 gallons) unit with a pre-charged cartridge.  
Performance criteria of 4% is satisfied.