MPV Pressure Test Bypass Valve

OVERVIEW

The MPV workstring valve is a full-opening, differential pressure operated bypass and workstring pressure testing valve for use in cased holes. This tool has the capability of allowing multiple pressure tests of the workstring. It also includes the capability to automatically fill the workstring with annular fluid while running in the hole.

FEATURES AND BENEFITS

This tool has the same basic features as the TST valve plus these additional features:

» Pressure testing is performed while running in the hole against a closed ball valve. Sealing on a valve that is always closed is a highly reliable method.
» The tool includes an internal bypass that allows the seal assembly to be stung in and out of a production packer as many times as required.
» The tool can be set to automatically operate at a specific predetermined hydrostatic pressure by using a rupture disk.

The MPV valve can be used downhole for:

» pressure testing workstring while running in the hole.
» pressure testing workstring after setting a retrievable packer or stinging into production packer.
» flexing tubing or drillpipe.

OPERATION

The MPV valve is composed of four sections: operating, autofill, ball valve, and bypass operating sections.

The operating section is activated by applying higher pressure above the ball valve section than below. The higher pressure above the ball valve section deactivates the autofill and bypass sections, allowing annulus pressure to be applied. (If a rupture disk is used, when communication through the rupture disk is established, annulus pressure must be higher than workstring pressure by approximately 500 to 600 psi.) Next, a differential pressure of approximately 250 to 300 psi disengages the primary locking mechanism, rolling the ball open and locking it in the open position.

The autofill section allows annular fluid to enter the workstring when annular pressure is 10 psi greater than the workstring pressure. The autofill section is closed when pressure testing. To reopen the autofill section, the pressure above and below the ball valve section must be equalized. The autofill section can be disabled by plugging three 1/4-in. NPT ports and using a rupture disk.
The ball valve section provides a highly reliable positive seal when pressure testing. This positive seal is maintained by a proven ball and seat configuration.

The bypass section is closed at the same time as the autofill section by applying higher pressure above the ball valve section than below. When the pressures above and below the ball valve section are equalized, the lower compression spring returns the bypass section to the open position.

*Note: Do not run a closed valve below the MPV valve. The trapped volume will interfere with successful tool operation.*

### EquipmentSpecifications

<table>
<thead>
<tr>
<th>Nominal Tool Size in.</th>
<th>Outer Diameter in. (cm)</th>
<th>Inner Diameter in. (cm)</th>
<th>Makeup Length in. (cm)</th>
<th>End Connections</th>
<th>Differential Pressure¹ psi (bar)</th>
<th>Tensile Load² lb (kg)</th>
<th>Service Temperature °F (°C)</th>
<th>Operating Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.00</td>
<td>5.03 (12.78)</td>
<td>2.28 (5.79)</td>
<td>141.24 (358.75)</td>
<td>3 7/8 CAS</td>
<td>15,000 (1034)</td>
<td>389,500 (176,677)</td>
<td>450 (232)</td>
<td>Rupture disk rating and/or 500 to 600 psi (34-41 bar) annulus pressure above workstring pressure at the tool</td>
</tr>
<tr>
<td>7.00</td>
<td>7.00 (17.78)</td>
<td>3.50 (8.89)</td>
<td>163.86 (416.20)</td>
<td>5 1/4 CAS</td>
<td>10,000 (689)</td>
<td>501,538 (227,498)</td>
<td>450 (232)</td>
<td>Rupture disk rating and/or 500 to 600 psi (34-41 bar) annulus pressure above workstring pressure at the tool</td>
</tr>
</tbody>
</table>

**Notes:**

¹ Differential pressure is the difference in pressure between the casing annulus and the tool ID.

² The values of tensile, burst, and collapse strength are calculated with new tool conditions, Lame’s formulas with Von-Mise’s Distortion Energy Theory for burst and collapse strength, and stress area calculations for tensile strength.

» Meets NACE MR0175 (>175°F / 79°C)

» These ratings are guidelines only. Refer to the equipment data book for individual equipment specifications.

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