Rupture Disc (RD) Tubing String Testing (TST) Valve

A TST VALVE WITH A NORMALLY CLOSED FLAPPER VALVE PROVIDING AUTOMATIC FILL OF THE WORKSTRING

OPERATION

The workstring can be pressure tested against the flapper valve when the bottomhole assembly (BHA) is below the rotary table. After the BHA has gone below the BOP, it is highly recommended to reverse circulate a minimum of 5 bbl of fluid (at 2 bbl/min minimum) to clear the flapper seat and flapper area of any potential debris that may prevent a good test. The workstring can be pressure tested as many times as required as the BHA is run in the hole. While the workstring is stationary, a spring keeps the flapper valve in the closed position, enabling the pressure to be applied from above for testing the workstring.

The RD TST valve will be set up to function at a pressure around 1000 psi (69 bar) above the well hydrostatic when on depth. This tool has internal shear pins that hold the mandrel in place while running in the hole. When on bottom, the first applied annulus cycle will activate the RD, which enables the inner mandrel to shear the pins and move up to open the flapper. After activated, the mandrel is locked in place, holding the flapper in the open position and disabling the tool for the remainder of the job.

This tool is not recommended for use with a seal bore packer. If using a permanent style packer, consider using the RD TST bypass tool.

OVERVIEW

The rupture disc (RD) tubing string testing (TST) valve is a full-opening valve used to pressure test the workstring while running in the hole. The flapper valve enables the workstring to self-fill going in the hole. Apply the required pressure test. The RD TST valve is deactivated after running into a predetermined depth or by applying annulus pressure with a set packer to rupture the RD, exposing the air chamber to the annular fluid. This total pressure now moves the mandrel up and opens the flapper, locking the mandrel in the upward position.

The TST valve consists of:
» Flapper valve and spring
» RD/air chamber
» Operating mandrel

FEATURES AND BENEFITS

» Flapper valve requires only 4 psi (0.3 bar) to open.
» Workstring can be pressure tested as many times as required as it is run in the hole.
» Valve deactivation pressure is predetermined by the RD that is selected.
» Valve can also be used for pipe flexing.
## Equipment Specifications

<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>Absolute Pressure¹ psi (bar)</th>
<th>Differential Pressure² psi (bar)</th>
<th>Tensile Load² lb (kg)</th>
<th>Service Temperature °F (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5.03 (12.78)</td>
<td>2.25 (5.72)</td>
<td>60.00 (152.40)</td>
<td>3 7/8 CAS</td>
<td>18,450 (1272)</td>
<td>15,000 (1034)</td>
<td>416,500 (188,921)</td>
<td>450 (232)</td>
</tr>
<tr>
<td>7</td>
<td>7.03 (17.86)</td>
<td>3.50 (8.89)</td>
<td>70.50 (179.07)</td>
<td>5 1/4 CAS</td>
<td>16,000 (1103)</td>
<td>10,000 (690)</td>
<td>550,000 (249,476)</td>
<td>400 (204)</td>
</tr>
</tbody>
</table>

Notes:

¹ Absolute pressure is the total hydrostatic plus applied pressure.

² Differential pressure is the difference in pressure between the casing annulus and the tool ID.

³ The values of tensile, burst, and collapse strength are calculated with new tool conditions, Lame’s formulas with Von-Mises’ Distortion Energy Theory for burst and collapse strength, and stress area calculations for tensile strength.

» Meets NACE MR0175 requirements (>175°F / 79°C)

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

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