Seabed Tubing String Testing (TST) Valve

A TST Valve Used Below the Seabed to Test Upper Landing String

OVERVIEW
The seabed tubing string testing (TST) valve is a full-opening valve used to pressure test the landing string while running in the hole. The seabed TST valve is operated after the bottomhole assembly (BHA) is stung into a permanent packer or after a retrievable packer is set. The TST valve is operated by annulus pressure, using a rupture disc (RD).

The TST valve consists of:
- Flapper valve and spring
- Shear pin section
- Locking rings
- It is used in conjunction with a TST in the BHA with previously was used to test the BHA and workstring from seabed to TD. Using this tool prevents unnecessary pressure test cycles on the workstring to BHA.

FEATURES AND BENEFITS
- Flapper valve requires only 4 psi (0.3 bar) to open.
- Landing string can be pressure tested as many times as required as it is run in the hole.
- RD burst pressure can be predetermined in 500 psi (34 bar) increments.

OPERATION
The TST valve is run just below the fluted hanger. On the initial “space out” run in hole, the TST flapper is held open by a sleeve so the workstring can be tested pressure against the TST valve in the BHA. This insures the lower connection of this tool is pressure tested. The landing string is then pulled out of hole up to the top connection on the seabed TST valve. Before the final run in hole, the hold open sleeve is removed from the TST valve. This enables the entire landing string to be pressure tested while running in hole and at depth. After the landing string pressure test is complete, the TST valve is operated when annulus pressure is applied to the predetermined RD rating. When the RD ruptures, the mandrel moves up and pushes the flapper open, enabling the locking ring to engage. The TST valve is then fully open for the duration of the job.
## 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 Load³ lb (kg)</th>
<th>Service Temperature °F (°C)</th>
<th>Flapper Differential Pressure psi (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 ¼</td>
<td>7.265 (18.453)</td>
<td>3.50 (8.89)</td>
<td>70.87 (180.01)</td>
<td>5 1/4 CAS</td>
<td>16,000 (1,103)</td>
<td>15,000 (1034)</td>
<td>876,000 (397,346)</td>
<td>30 to 300 (-1 to 149)</td>
<td>10,000 (690)</td>
</tr>
</tbody>
</table>

Notes:

1. Absolute pressure is hydrostatic pressure plus applied pump 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-Mise’s Distortion Energy Theory for burst and collapse strength, and stress area calculations for tensile strength.

* Meets NACE MR0175 requirements for all temperatures
* These ratings are guidelines only. Refer to the equipment data book for individual equipment specifications.

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