High-Expansion Thru-Tubing Bridge Plug (TTBP) Solution

UNSURPASSED PERFORMANCE FOR CONFORMANCE AND PLUG-BACK RECOMPLETIONS

OVERVIEW

The Halliburton high-expansion thru-tubing bridge plug (TTBP) solution offers unsurpassed performance for conformance and plug-back recompletions. The recompletion solution comprises the following components:

- High-expansion thru-tubing elastomeric seal
- Downhole Power Unit (DPU®) long stroke nonexplosive electromechanical setting tool
- Nonexplosive Positive Displacement Dump Bailer (PDDB)
- Engineered cement mix and system
- 2½- and 1½-in. run-in diameter systems
- Conveyance options on Slickline, E-line, or RELAY™ Digital Slickline

The slip assemblies located at the top of the plug support a bidirectional force of up to 60,000 lbf (267 kN) and provide the stable base for the required cement plug. To obtain the 60,000 lbf of bidirectional support, the slip assemblies are designed to operate in a specific casing size and weight range. Therefore, a family of TTBP is available for commonly used casing sizes.

The sealing elements are designed to provide an effective seal from ambient room temperature up to temperatures as high as 350°F (177°C), and ensure long-term seal integrity. The anchoring slips and the integral centralizers support the tool in highly deviated well conditions. The set plug length is the shortest in the industry and is the base for subsequent cement placement.

The long stroke DPU setting tool records in real time the stroke length, setting force, and load profile at which the DPU tool detaches from the plug. Recording of the setting event provides quality assurance of the setting operation. The DPU setting tool does not use explosive materials and can be used to set a full range of thru-tubing wellbore plugging devices.

The cement plug barrier is designed to be dumped rather than pumped. The cement is formulated to have a high-shear bond, which provides the sealing and adhesion properties of the set cement to the inside of the casing. Accurate temperature at the plug-setting depth is needed for selection of the required cement additives, which can be obtained by running a temperature sensor with the gauge run.

The cement is placed on top of the TTBP with a PDDB, which minimizes the contamination of the cement slurry with borehole fluids and ensures plugging integrity.

FEATURES

- The self-centralizing slips and anchors provide large support force and differential pressure rating
- Run in / run out of hole line speed modeled to minimize swab or surge effects on the dumped cement prior to setting
- The TTBP design allows for rapid scaling up or down for additional or custom casing sizes
- Prepackaged cement kits contain all the required additives for a wide variety of temperature applications

BENEFITS

- Provides total rigless recompletion solution
- Increased safety through nonexplosive plug setting and subsequent dump bailer cement operations
- Record of setting force and stroke length provides positive assurance of plug setting
- Swell material used in the high-expansion plug helps ensure long-term seal reliability
- The DPU tool can be used in any borehole fluid (gas, oil, and water)
Halliburton 2½-in. Thru-Tubing Elastomeric Bridge Plugs†

<table>
<thead>
<tr>
<th>P/N</th>
<th>Casing OD in.</th>
<th>Casing lb/ft</th>
<th>Casing ID in.</th>
<th>RIH OD</th>
<th>Stroke to Set</th>
<th>Set Lg*</th>
<th>Diff Pressure**</th>
</tr>
</thead>
<tbody>
<tr>
<td>101999722</td>
<td>5</td>
<td>15-20</td>
<td>4.408-4.184</td>
<td>2.13 in.</td>
<td>30.3 in. (76.96 cm)</td>
<td>278 in. (70.61 cm)</td>
<td>2,000 psi (137.9 bar)</td>
</tr>
<tr>
<td>101999723</td>
<td>5</td>
<td>18-23</td>
<td>4.276-4.044</td>
<td>2.13 in.</td>
<td>30.3 in. (76.96 cm)</td>
<td>278 in. (70.61 cm)</td>
<td>2,000 psi (137.9 bar)</td>
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<tr>
<td>101999724</td>
<td>5½</td>
<td>17-23</td>
<td>4.892-4.670</td>
<td>2.13 in.</td>
<td>39.1 in. (99.31 cm)</td>
<td>28.6 in. (72.64 cm)</td>
<td>2,000 psi (137.9 bar)</td>
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<tr>
<td>101999726</td>
<td>5½</td>
<td>23-26</td>
<td>4.670-4.548</td>
<td>2.13 in.</td>
<td>39.1 in. (99.31 cm)</td>
<td>28.6 in. (72.64 cm)</td>
<td>2,000 psi (137.9 bar)</td>
</tr>
<tr>
<td>101918584</td>
<td>6½</td>
<td>24-32</td>
<td>5.921-5.675</td>
<td>2.13 in.</td>
<td>59.8 in. (151.89 cm)</td>
<td>29.4 in. (74.67 cm)</td>
<td>2,000 psi (137.9 bar)</td>
</tr>
<tr>
<td>101911386</td>
<td>7</td>
<td>20-35</td>
<td>6.011-6.453</td>
<td>2.13 in.</td>
<td>77.2 in. (196.08 cm)</td>
<td>29.4 in. (74.67 cm)</td>
<td>1,800 psi (124.1 bar)</td>
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<tr>
<td>101918584</td>
<td>7</td>
<td>38-42</td>
<td>5.750-5.920</td>
<td>2.13 in.</td>
<td>59.8 in. (151.89 cm)</td>
<td>29.4 in. (74.67 cm)</td>
<td>2,000 psi (137.9 bar)</td>
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<tr>
<td>101829448</td>
<td>7½</td>
<td>26-39</td>
<td>6.960-6.625</td>
<td>2.13 in.</td>
<td>77.2 in. (196.08 cm)</td>
<td>29.4 in. (74.67 cm)</td>
<td>1,500 psi (103.4 bar)</td>
</tr>
</tbody>
</table>

† All Halliburton 2½-in.TTBP have a maximum temperature rating of 350°F (177°C)
* The seal material length is approximately 1-in. long when plug is fully set
**Pressure differential hold force of slips without cement; cement placed on plug is required for desired differential

Halliburton 1¾-in. Thru-Tubing Elastomeric Bridge Plugs†+

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<thead>
<tr>
<th>P/N</th>
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<th>Casing lb/ft</th>
<th>Casing ID in.</th>
<th>RIH OD</th>
<th>Stroke to Set</th>
<th>Set Lg*</th>
<th>Diff Pressure**</th>
</tr>
</thead>
<tbody>
<tr>
<td>102781186</td>
<td>7</td>
<td>23-26</td>
<td>6.366-6.276</td>
<td>1.70 in.</td>
<td>37.5 in. (95.25 cm)</td>
<td>24.75 in. (62.87 cm)</td>
<td>1,500 psi (103.4 bar)</td>
</tr>
</tbody>
</table>

† All Halliburton 1½-in. TTBP have a maximum temperature rating of 150-280°F (66-138°C)
* The seal material length is approximately 1-in. long when plug is fully set
**Pressure differential hold force of slips without cement; cement placed on plug is required for desired differential

DPU® 2LS-i Tool

<table>
<thead>
<tr>
<th>P/N</th>
<th>Tool OD (in.)</th>
<th>Pressure Rating</th>
<th>Temp Rating</th>
<th>MaxForce® Output</th>
<th>Stroke Length</th>
<th>Stroke Rate</th>
<th>Tool Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>101690616</td>
<td>2½ in. (54 mm)</td>
<td>20,000 psi (1379 bar)</td>
<td>350°F (177°C)</td>
<td>15,000 lbf (66.7 kN)</td>
<td>85.0 in. (216 cm)</td>
<td>2.0-2.4 in./min (5-6 cm/min)</td>
<td>365 in. (927 cm)</td>
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</tbody>
</table>

1¼ in. EDPU® Tool

<table>
<thead>
<tr>
<th>P/N</th>
<th>Tool OD (in.)</th>
<th>Pressure Rating</th>
<th>Temp Rating</th>
<th>MaxForce® Output</th>
<th>Stroke Length</th>
<th>Stroke Rate</th>
<th>Tool Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>102750943</td>
<td>1¼ in. (43 mm)</td>
<td>15,000 psi (103.4 bar)</td>
<td>300°F (149°C)</td>
<td>15,000 lbf (66.7 kN)</td>
<td>39.5 in. (100.3 cm)</td>
<td>0.5 in./min (1.3 cm/min)</td>
<td>133 in. (338 cm)</td>
</tr>
</tbody>
</table>

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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