LINER TOP PACKER

The Liner Top Packer is a hydraulically actuated permanent packer that is set in the intermediate casing string in Open Hole Multi-Stage Stimulation System. The packer provides an anchor point for the open hole section of the system. The Liner Top Packer is carried in on a solid nut running tool that rotationally releases from the packer once all equipment has been set. A frac string with a latch seal assembly can then be stung into the Liner Top Packer to conduct fracturing operations.

FEATURES AND BENEFITS OF THE LINER TOP PACKER

- High pressure and tensile ratings designed to withstand forces created by fracture treatments.
- Full drift liner capabilities eliminates restrictions.
- Interlocked expandable metal back-up rings prevents elastomer extrusion.
- Tension/compression full circle slips provides superior anchoring capability.

<table>
<thead>
<tr>
<th>Size</th>
<th>Casing Range</th>
<th>Tool Dimensions</th>
<th>Minimum Pack-off</th>
<th>Shear Screw Max Qty</th>
<th>Pressure/Screw</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>Lbs/ft</td>
<td>Inch</td>
<td>Inch</td>
<td>Psi</td>
<td>Psi</td>
<td>Feet</td>
</tr>
<tr>
<td>mm</td>
<td>Kg/m</td>
<td>mm</td>
<td>mm</td>
<td>kPa</td>
<td>kPa</td>
<td>Meters</td>
</tr>
<tr>
<td>7.00</td>
<td>23-32</td>
<td>4.000</td>
<td>5.90</td>
<td>2500</td>
<td>247</td>
<td>4.66</td>
</tr>
<tr>
<td>177.80</td>
<td>34.2-47.6</td>
<td>101.60</td>
<td>149.86</td>
<td>1722.50</td>
<td>1702</td>
<td>1.42</td>
</tr>
</tbody>
</table>
MULTI-BALL FRAC SLEEVE

The Multi-Ball Frac Sleeve is a ball activated ported sleeve used to fracture formation intervals with Bakken Buster Open Hole Multi-Stage Stimulation System. Each Sleeve uses an incrementally sized ball seat that coincides with a specific diameter of ball that opens each individual sleeve. Ball seats are designed to ensure high volume frac treatments without the concern for seat erosion while the ball seats can be milled out to full liner drift requirements. The unique design of the ball seats also promotes full formation production potential during ballflow back operations. The shifting balls are field proven and are designed to provide high impact resistance during ball seat landing, have high compressive load capability during fracturing operations, and have a low specific gravity to promote flow-back.

FEATURES AND BENEFITS OF THE MULTI-BALL FRAC SLEEVE

- Full liner drift capability after seat mill-out.
- Locking internal components promotes fast seat mill-out.
- Unique seat geometry prevents ball/debris from plugging seat during flow back operations.
- Compact design to facilitate easy open hole installation.
- Up to 15,000 psi differential pressure capability to fracture tight formations.
- Field proven ball technology delivers reliability.
- Large port flow area to prevent screen outs.

<table>
<thead>
<tr>
<th>Size</th>
<th>Tool Dimensions</th>
<th>Tool OD</th>
<th>Shear Screw Max Qty</th>
<th>Pressure/Screw</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>mm</td>
<td>Inch</td>
<td>mm</td>
<td>Psi</td>
<td>Feet</td>
</tr>
<tr>
<td>4.50</td>
<td>3.875</td>
<td>5.75</td>
<td>8</td>
<td>350</td>
<td>2.80</td>
</tr>
<tr>
<td>144.30</td>
<td>98.43</td>
<td>146.05</td>
<td></td>
<td>2413</td>
<td>0.85</td>
</tr>
</tbody>
</table>
OPEN HOLE HYDRAULIC FRAC PACKER

The Open Hole Hydraulic Frac Packer is a key component of Bakken Buster Open Hole Multi-Stage Stimulation system. Each packer provides reliable open hole pressure isolation to divert fracture treatments into selective intervals. The packer’s unique simplistic design promotes reliability without sacrificing performance. If desired by the operator, multiple packers can be cost effectively stacked together along the liner within an interval to create multiple isolation points in open holes with questionable formation integrity.

FEATURES AND BENEFITS OF THE FRAC

- Full bore liner ID through the packer to eliminate restrictions.
- 15000-10,000 psi differential pressure rating to fracture tight formations.
- Compact design to facilitate easy open hole installation.
- Unique elastomeric element design for improved pressure competency.
- Can be economically stacked to increase isolation reliability.

<table>
<thead>
<tr>
<th>Size</th>
<th>Product Number</th>
<th>Tool Dimensions</th>
<th>Tool OD</th>
<th>Shear Screw Max</th>
<th>Pressure/Screw</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>mm</td>
<td>ID Max Setting Range</td>
<td>Inch mm mm</td>
<td>Inch mm</td>
<td>Psi kPa</td>
<td>Feet Meters</td>
</tr>
<tr>
<td>4.50</td>
<td>450.200.000</td>
<td>4.000 6.00-6.50</td>
<td>5.91</td>
<td>8</td>
<td>412 2839</td>
<td>1.94 0.59</td>
</tr>
<tr>
<td>144.30</td>
<td>150.11</td>
<td>101.60 152.40-165.10</td>
<td>150.11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
OPEN HOLE SWELL PACKER:

The Multi-Ball Frac Sleeve is a ball activated ported sleeve used to fracture formation intervals with Bakken Buster Open Hole Multi-Stage Stimulation System. Each Sleeve uses an incrementally sized ball seat that coincides with a specific diameter of ball that opens each individual sleeve. Ball seats are designed to ensure high volume frac treatments without the concern for seat erosion while the ballseats can be milled out to full liner drift requirements. The unique design of the ball seats also promotes full formation production potential during ballflow back operations. The shifting balls are field proven and are designed to provide high impact resistance during ball seat landing, have high compressive load capability during fracturing operations, and have a low specific gravity to promote flow-back.

FEATURES:

- Base Pipe: 4.500", P110-
- Threads: LT or BTC
- Element OD: 5.625" for 6" Open Hole
- Element Length: 5 FT Continues Element
- Element Type: Oil or Water-Swellable
- Total Length: 13 FT Including Tong MakeupSpace
  Pressure Rate: 6000 psi Up To 10,000 psi Available

BENEFITS:

- Simple and low cost solution to horizontal zonal isolation
- No moving parts.
- Bonded to base pipe.
- Conforms to open hole.
- No pup joints needed for handling purposes

<table>
<thead>
<tr>
<th>Size</th>
<th>Tool Dimensions</th>
<th>Over All Length</th>
<th>Pressure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>Inch</td>
<td>FT</td>
<td>PSI</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>m</td>
<td>mpa</td>
</tr>
<tr>
<td>4.5&quot;</td>
<td>4&quot;</td>
<td>13'</td>
<td>6k to 10k</td>
</tr>
<tr>
<td>144.3</td>
<td>101.6</td>
<td>3.962</td>
<td>41 to 68</td>
</tr>
<tr>
<td>5.625</td>
<td>142.875</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PRESSURE ACTUATED VALVE

The Pressure Actuated Valve is the lower-most frac sleeve in Hole Multi-Stage Stimulation System. The sleeve is designed to function open by creating differential pressure in favor of the liner to fracture or circulate into the chosen interval in the wellbore. The actuation of this valve allows for ball drop operations to commence and function the remaining Multi-Ball Frac Sleeves along the horizontal wellbore from the bottom up.

FEATURES AND BENEFITS OF THE PRESSURE ACTUATED VALVE

- Full drift liner ID through the valve to eliminate restrictions.
- Externally exposed shear screws to customize opening pressure.
- Compact design to facilitate easy open hole installation.
- Shifting valve locks open to prevent valve closure during the production phase.

<table>
<thead>
<tr>
<th>Size</th>
<th>Product Number</th>
<th>Tool Dimensions</th>
<th>Shear Screw Max Qty</th>
<th>Pressure/Screw</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>450.300.000</td>
<td>ID Max Inch</td>
<td>Tool OD Inch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mm</td>
<td></td>
<td>mm</td>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.50</td>
<td></td>
<td>3.875</td>
<td>5.48</td>
<td>744</td>
<td>2.45</td>
</tr>
<tr>
<td>144.30</td>
<td></td>
<td>98.43</td>
<td>139.19</td>
<td>5126</td>
<td>0.74</td>
</tr>
</tbody>
</table>
TOE VALVE

The Toe Valve is a ball-actuated liner blanking device that permits the activation of all hydraulic equipment in Open Hole Multi-Stage Stimulation System. The valve incorporates an internal locking device to prevent the valve from opening once closed. Specific internal geometric flow ports with bypasses direct fluid flow more gradually reducing the chance of plugging while circulating.

FEATURES AND BENEFITS OF THE TOE VALVE

- 15,000 psi burst capability when closed.
- Compact design to facilitate easy open hole installation.
- Shifting valve locks closed to prevent valve from opening.

<table>
<thead>
<tr>
<th>Size</th>
<th>Product Number</th>
<th>Tool Dimensions</th>
<th>Tool Overall Length</th>
<th>Shear Screw Max Qty</th>
<th>Pressure/Screw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>mm</td>
<td>ID Max Inch</td>
<td>Tool OD Inch</td>
<td>Length ft</td>
<td>Psi kPa</td>
</tr>
<tr>
<td>4.50</td>
<td>144.30</td>
<td>0.750 mm</td>
<td>4.98 mm</td>
<td>2.60 ft</td>
<td>450 kPa</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19.05 mm</td>
<td>126.49 mm</td>
<td>0.79 m</td>
<td>3100 kPa</td>
</tr>
</tbody>
</table>
OPEN HOLE ANCHOR PACKER

Designed with a focus on Multi-Zone Fracturing applications and along with the Deep Service Top Seal™ packer is our High Temperature / High Pressure, hydraulically set Anchor Packer.

The elements are of proven High Temperature /High-Pressure elastomers with the maximum available expansion to seal in oversized holes.

The Deep Seal Anchor Packer is designed with low friction standoff centralization to protect and aid in deployment of the liner into the well bore, this low drag coefficient centralizer is highly beneficial in getting the liner through any tight spots that may be encountered in the well bore.

<table>
<thead>
<tr>
<th>Size</th>
<th>Product Number</th>
<th>Tool Dimensions</th>
<th>Tool OD</th>
<th>Shear Screw Max Qty</th>
<th>Pressure/Screw</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch</td>
<td>138-4561-000-000</td>
<td>inch mm</td>
<td>inch mm</td>
<td>8</td>
<td>psi kpa</td>
<td>feet meters</td>
</tr>
<tr>
<td>mm</td>
<td>4.5</td>
<td>6.25 101.6</td>
<td>5.87 149.1</td>
<td>357 2461</td>
<td>9.5 2.89</td>
<td></td>
</tr>
</tbody>
</table>
WHAT IS MULTI-ZONEFRACTURING?

Multi-Zone Fracturing is a method of dividing a horizontal wellbore into multiple intervals that are individually fractured for increased production. The most popular method for isolating frac intervals is with an open hole multi-stage completion system.

The entire completions industry, both domestically and internationally, is adopting multi-stage fracturing technology and this method is becoming the “standardized way” of completing wells for production.

OUR TOOL: HIGHLIGHTS AND BENEFITS

The Open Hole Multi-Stage Fracturing System uses specially designed short radius open-hole packers and frac sleeves to isolate intervals of a horizontal section for targeted fracture treatment placement. The result is greater control of the frac treatment and the possibility of fracturing the entire length of the lateral and increasing production.

THE SYSTEM DELIVERS THREE DISTINCT FEATURES:

**NO CEMENTING**
Open-hole packers provide isolation along the length of the liner. This eliminates the need to cement the liner in the lateral section and increases the formation interface.

**NO PERFORATING**
The sleeves provide access to the zone of completion for both fracturing and production.

**NO DOWNTIME**
The system is a one-trip system, so fracture treatments for each section can be pumped on the same day eliminating the expense of mobilization and demobilization of pumping equipment.

One major challenge in completing high-angle wells in open-hole is simply getting the tools through dog-legs and other restrictions to total depth. The Open Hole Multi-Stage Fracturing System uses design expertise and operational excellence to meet this challenge. Since the system’s packers are shorter than conventional tools, they can navigate more easily through more aggressive build rates.
SET YOUR SELF A PART

The TMOT Open Hole Multi-Stage Fracturing System offers the following distinct competitive advantages:

1. Improved operational installation efficiency by using short radius capable equipment
2. Improved flow characteristics for frac ball displacement and flowback operations
3. Improved open hole packer sealability to formation face
4. Improved frac ball impact resistance and extrusion resistance during fracturing operations
5. Improvement of general equipment reliability
6. Improved solids control capability
7. Improved manufacturing efficiency, quality control, and timely product delivery

About TMOT

TMOT is an organization whose foundation is based upon sound engineered technology, high-quality products, personnel with extensive industry knowledge, and excellent service philosophy. With our industry experience and intimate product knowledge, we have identified numerous opportunities for optimizing, diversifying and creating more reliable wellbore completion technologies.

How TMOT Differs From Their Competitor:

• Employ a comprehensive business model encompassing all facets of our activities including decision-making processes, leveraging of established customer relationships and effective operational functionality.

• Provide a complete value solution to clients from cutting-edge technology at competitive prices to best-in-class customer support services - rarely provided in the market today.

• Maintain a robust suite of in-house design and application engineering capabilities based on a unique and intimate knowledge of multi-stage fracturing technologies.

• Incorporating innovative equipment design, to provide clients with top-tier operational reliability and reduced well installation costs.

• Provide pro-active custom technical solutions and establish TMOT as a niche leader in multi-stage fracturing technology.

• Provide for anticipated client requirements ahead of the market - includes developing a leading edge knowledge center client requirements, provision of personnel with versatile expertise, and best-in-class response times.